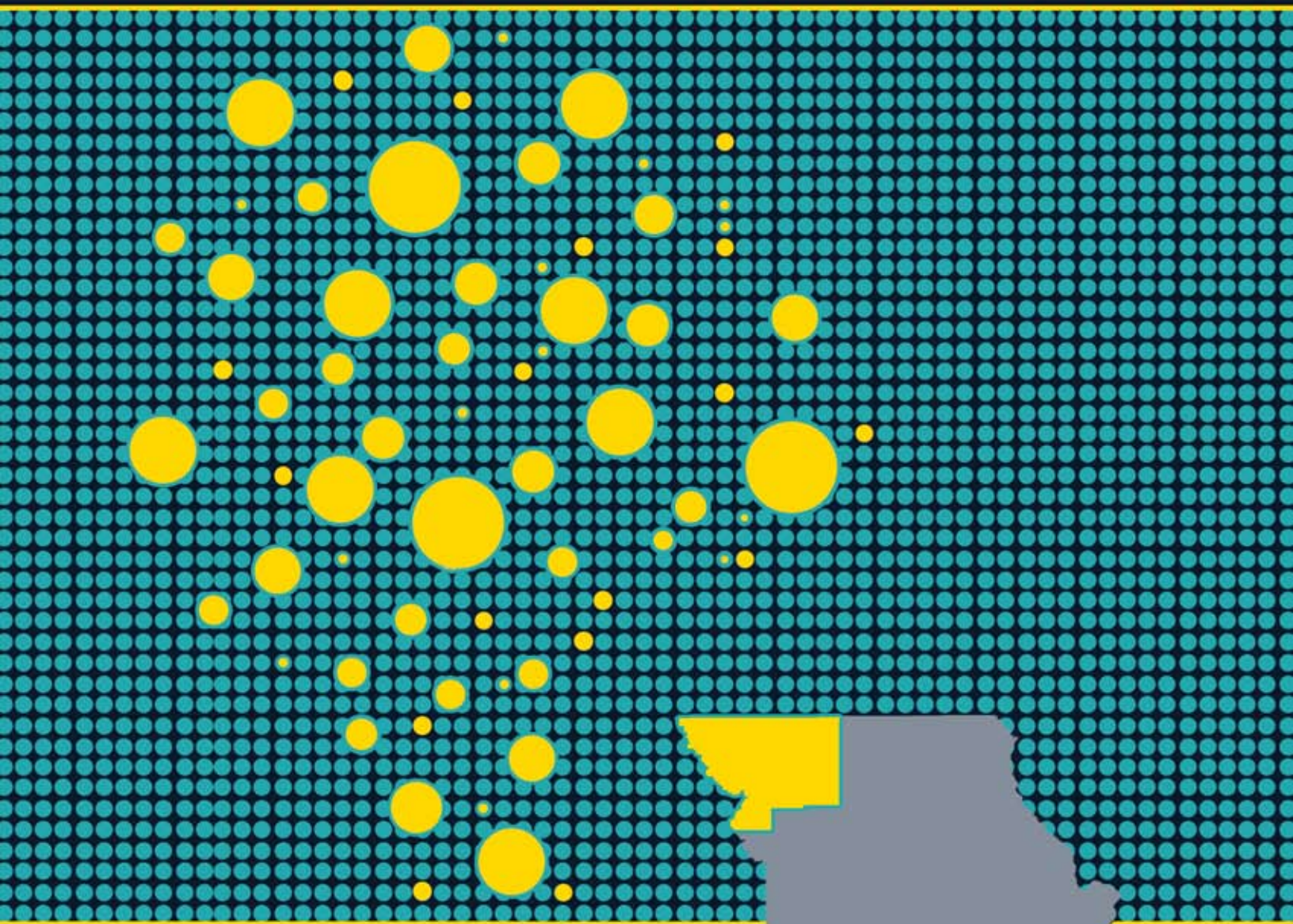


PATTERN ANALYSIS

HIGHLIGHTING INDUSTRY PATTERNS THAT DRIVE NEW
WEALTH IN A REGIONAL ECONOMY



NORTHWEST REGION

Northwest Region

AN INTRODUCTION TO INDUSTRY PATTERN ANALYSIS

Discovering patterns of connected industries can be difficult given the number of companies in an economy and the data available for analysis. Yet understanding the business patterns that drive wealth in a region is critical to designing effective development initiatives.

This report uses industry trend, concentration, and individual firm data to summarize two important patterns in a region's economic core:

- **Spot Strengths** of large sector employment, typically in one or two firms, and
- **Core Clusters** of employment across a mix of similar or linked industries.

Recognizing spot strengths and core cluster patterns is important as these collectively large employers attract new income to a region. Knowing these industries, and the shared supply-chain and labor issues these companies have, can aid economic and workforce developers in crafting policies for the broadest impact.

Pattern analysis highlights the strengths and linkages of area industries and can serve as a starting point for understanding a regional economy. People familiar with company operations know that no two firms have the same business model. Pattern information should ultimately be enhanced by individuals with local business knowledge.

See the **NOTES** section for more details on industry pattern analysis and the methods used in this report.





Northwest Region

What comes after “Pattern Recognition?”

Economic and workforce developers have been speaking the “cluster” language for a long time. However, just knowing that an industry pattern exists is only one step in the process. Here are some additional things to consider:

Group Think

While large, individual businesses will always be important and drive some policy actions, decision-makers can use pattern knowledge to focus efforts on the common problems that related businesses have. This approach makes the best use of limited resources by providing the biggest impact to the most companies.

Customize Help

One size does not fit all when it comes to supporting an industry pattern. Assisting a business cluster may involve specific projects like expanding utilities or broader actions such as helping attract additional knowledge workers. Whatever the needs, the pattern approach can help prioritize actions.

Work on Workforce

Many business location or expansion decisions revolve around issues of available labor. Workforce training geared toward supporting clusters can be very valuable as many of the firms hire workers with similar skill sets. Likewise, talented workers want to locate where clusters of similar businesses offer better odds at finding employment.

Career centers, community colleges, and universities can customize training programs to meet the need of cluster industries for specialized workers.

Spread the Word

Economic and workforce developers can tell the story of how a region’s industries and institutions create clusters of opportunity for existing companies, workers, and new investment. Examples such as the Animal Health Corridor (Missouri-Kansas) and the Plant and Medical Sciences Cluster (St. Louis) are excellent branding campaigns that highlight the combined strengths of businesses, universities, incubators, and workforce to form clusters of growth.

Plan for the Future

The current recession reminds everyone that major structural changes in the economy will occur from time to time. Missouri’s automotive industry is undergoing that change right now. Developers that understand a region’s pattern of industries will be better positioned to promote new opportunities of growth that fit well with an economy’s existing and transforming strengths.

Northwest Region

INDUSTRY OVERVIEW

The Northwest Region has a population of 176,575, or 3 percent of Missouri's total population. The economic center is St. Joseph, where 47 percent of area residents work. Nearly 8 percent are employed in Maryville, the home of Northwest Missouri State University, while 5.8 percent commute to Kansas City.* The average wage in 2008 was \$31,103.

In 2008 non-farm employment was 73,475, which includes public and private sectors. Manufacturing employed 18 percent of area workers, a higher percentage than the state (11%) and all but two of Missouri's 12 economic regions. Manufacturing, combined with healthcare and retail sectors, employed 45 percent of all workers. Although most employment in the primary farming sector is not captured by this measure, over 10,000 people were estimated to be either a farm owner or worker in 2007.** Many of these farmers may also have other jobs, but clearly agriculture is a significant part of this region's economy.

Northwest Region Industry Employment 2008				
NAICS	Industry	Annual Avg. Emp.	Perc. Total Emp.	Annual Avg. Wage
11	Agriculture, Forestry, Fishing, and Hunting	516	0.7%	\$22,155
21	Mining	72	0.1%	\$34,212
22	Utilities	537	0.7%	\$49,899
23	Construction	3,479	4.7%	\$43,986
31-33	Manufacturing	13,201	18.0%	\$38,538
42	Wholesale Trade	3,125	4.3%	\$39,155
44-45	Retail Trade	9,351	12.7%	\$20,751
48-49	Transportation and Warehousing	2,142	2.9%	\$33,151
51	Information	1,136	1.5%	\$29,214
52	Finance and Insurance	2,835	3.9%	\$38,677
53	Real Estate and Rental and Leasing	609	0.8%	\$21,891
54	Professional, Scientific, and Technical Services	1,552	2.1%	\$45,776
55	Management of Companies and Enterprises	470	0.6%	\$49,596
56	Administrative and Support Services	3,258	4.4%	\$21,041
61	Educational Services	6,438	8.8%	\$31,861
62	Health Care and Social Assistance	10,523	14.3%	\$36,250
71	Arts, Entertainment, and Recreation	1,033	1.4%	\$16,140
72	Accommodation and Food Services	5,953	8.1%	\$11,147
81	Other Services	2,486	3.4%	\$20,797
92	Public Administration	4,761	6.5%	\$32,572
TOTAL		73,475		\$31,103

* Local Employment Dynamics, U.S. Census Bureau, 2008.

**The most accurate and timely industry employment numbers come from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages program (QCEW). However, reporting requirements for this program excludes most farmers so the USDA 2007 Census of Agriculture is used as an alternative, non-comparative measure.

Northwest Region

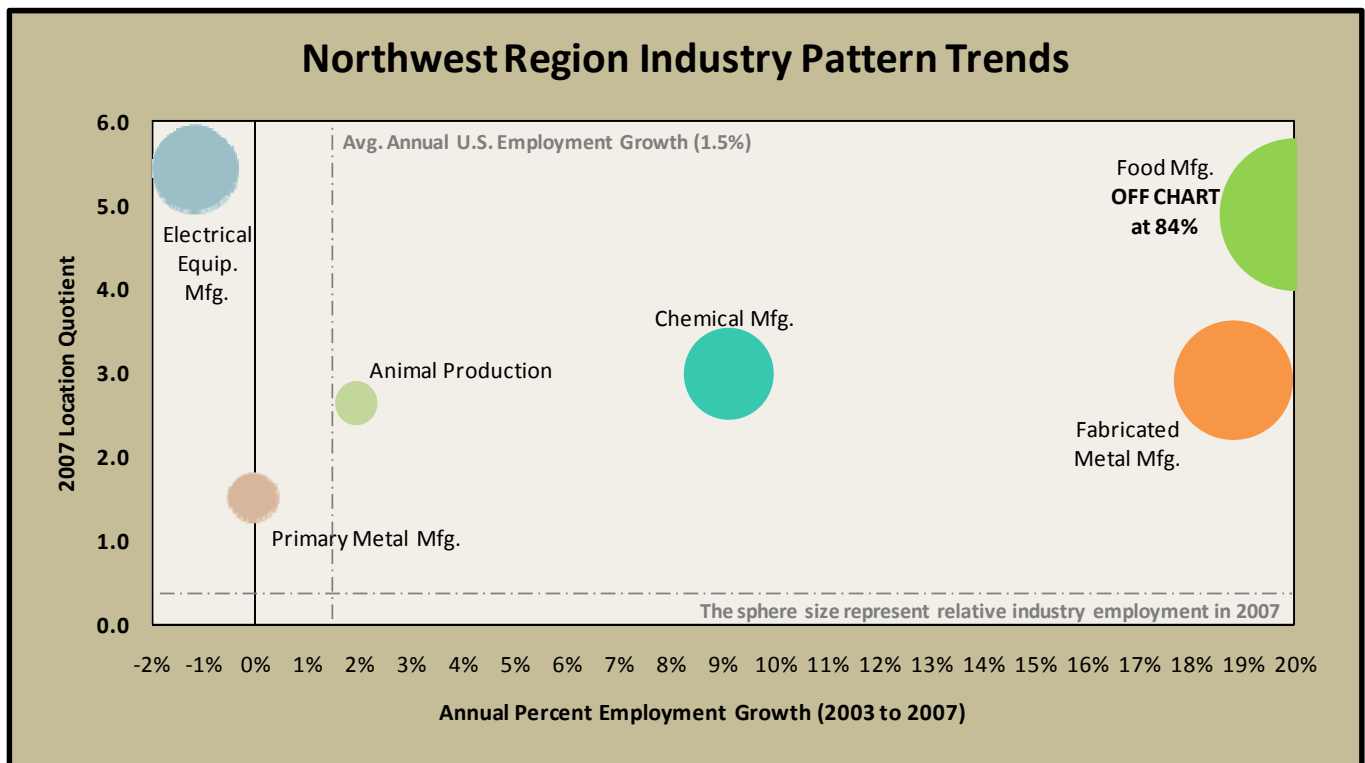
INDUSTRY PATTERNS

Northwest Missouri industry analysis revealed a number of core clusters and spot strengths that can be described in three broad patterns. Agribusiness, Energy, and Metal Manufacturing represent strong industry concentrations in the region and encompass firms in a variety of industry subsectors.

Industry Pattern Type and Location Quotient (LQ)

TYPE	NAICS	INDUSTRY	LQ
Cluster	112	Animal Production	2.6
Spot	311	Food Manufacturing	4.9
Cluster	325	Chemical Manufacturing	3.0
Spot	335	Electrical Equipment and Appliance Mfg.	5.4
Spot	331	Primary Metal Manufacturing	1.5
Cluster	332	Fabricated Metal Product Manufacturing	2.9

These core cluster and spot industries account for over 9,000 area jobs, or 16 percent of all private employment.* Over half of the employment in these industries is located in sectors with average wages above \$45,000 a year.



* Spot industry employment by detailed sector is not reportable due to BLS confidentiality restrictions.



Northwest Region

Agribusiness Core Cluster

Animal Production (NAICS 112)

Food Manufacturing (NAICS 311) - Spot Strength

Subset of Firms in Chemical Manufacturing (NAICS 325)

The Agribusiness cluster in northwest Missouri is comprised of more traditional agricultural enterprises, such as farming, granaries, and food manufacturers, along with advanced agri-science operations in the chemical manufacturing sector.*

Food manufacturing grew tremendously from 2003 to 2007, increasing over 300 percent during the 4 years. These firms, which produce food for human and animal consumption, are advantageously surrounded by four major feedstock states; Missouri, Kansas, Nebraska, and Iowa. This region also makes up the northern part of the Animal Health Corridor, which stretches from Columbia, MO through Kansas City to Manhattan, KS. This Corridor is home to a large number of companies and universities that lead the nation in animal nutrition and health science.

Many of the firms in chemical manufacturing are also directly tied to the Animal Health Corridor. Northwest manufacturers specialize in veterinary pharmaceuticals, animal food additives, and other agricultural chemical products. Chemical manufacturing employment grew substantially from 2003 to 2007 with an annual increase just over 9 percent.

Northwest agribusiness manufacturing showed positive employment growth well into 2009, even as the national economy was hitting a recessionary bottom. This continued employment strength and the diversity of agricultural products bode well for the future of this regional pattern industry.

Energy Spot Strength

Electrical Equipment and Appliance Manufacturing (NAICS 335)

Subset of Firms in Chemical Manufacturing (NAICS 325)

Rock Port, in northwest Missouri, was recognized in 2008 as the first 100 percent wind-powered city in America. It is fitting then that the Northwest Region also has a pattern of existing industries that are concentrated in new and traditional energy products.

* Crop and animal production employment from the Quarterly Census of Employment and Wages (QCEW) does not capture most farm production employment. The U.S. 2007 Census of Agriculture indicated that a combined total of 10,101 farm owners and hired labor worked in the Northwest Region but due to different collection methodologies cannot be directly added to the QCEW. However, the Agriculture Census employment numbers do highlight the greater significance of farm production to the region's economy.



Northwest Region

From biofuels to batteries, many firms in this region are well-suited to play a role in the national effort to accelerate non-petroleum energy sources. First and second generation biofuel facilities operate in the area and benefit from a central feedstock location, just like firms in the agribusiness cluster. The electrical equipment manufacturing sector includes companies working in battery technology, a key concern for electric cars, and solar/wind power storage.

Energy pattern industries in the Northwest Region are currently concentrated in a small number of firms. Hopefully a continued national focus on alternative energy research will help local companies, university researchers, and entrepreneurs expand this pattern industry into a larger cluster over time.

Metal Manufacturing Core Cluster

Primary Metal Manufacturing (NAICS 331) - Spot Strength

Fabricated Metal Manufacturing (NAICS 332)

Metal manufacturing includes firms in the primary and fabricated metal industries that are likely connected in this region. Fabricated metal producers, by far the largest employing group in the cluster, shape basic metal forms provided by primary metal manufacturers. Producers of fabricated metal typically develop inputs that are used in other final goods and services.

A number of mid-sized firms in the region are classified as machine shops which typically produce customized metal products for a variety of manufacturing contracts. Other fabricated metal producers specialize in utility vehicle platforms, wire ropes, metal buildings, and metal containers.

Employment in primary metal manufacturing was flat from 2003 to 2007 while fabricated metal firms grew annually at 18.8 percent, a tremendous rate compared to the national average of 1.5 percent. The cluster did decline in employment through the recession but still had substantial employment and an LQ over 2.5 in 2009.

Northwest Region

INDUSTRY CONTRIBUTION IMPACT: CHEMICAL MANUFACTURING

Pattern recognition is important since changes to business production can have broad regional impacts across a range of linked industries and institutions. Chemical manufacturing is analyzed in this example of how those connections positively influence the area's economy.

Chemical manufacturing includes the primary inputs of organic and inorganic chemicals, petroleum refining, paper and plastic containers, industrial machinery maintenance, and scientific research and development. The industry makes agribusiness chemicals, fertilizers, pesticides, and pharmaceutical products that are typically inputs to other final products sold in export markets, thereby bringing additional money into the regional economy.

Chemical manufacturing workers are among the highest paid in the region at over \$58,000. An addition of 100 employees in chemical manufacturing creates an estimated total of 429 jobs paying \$20.9 million in salaries and contributing over \$56.1 million to the gross state product. The value-added per worker in chemical manufacturing and supporting industries is \$130,738.



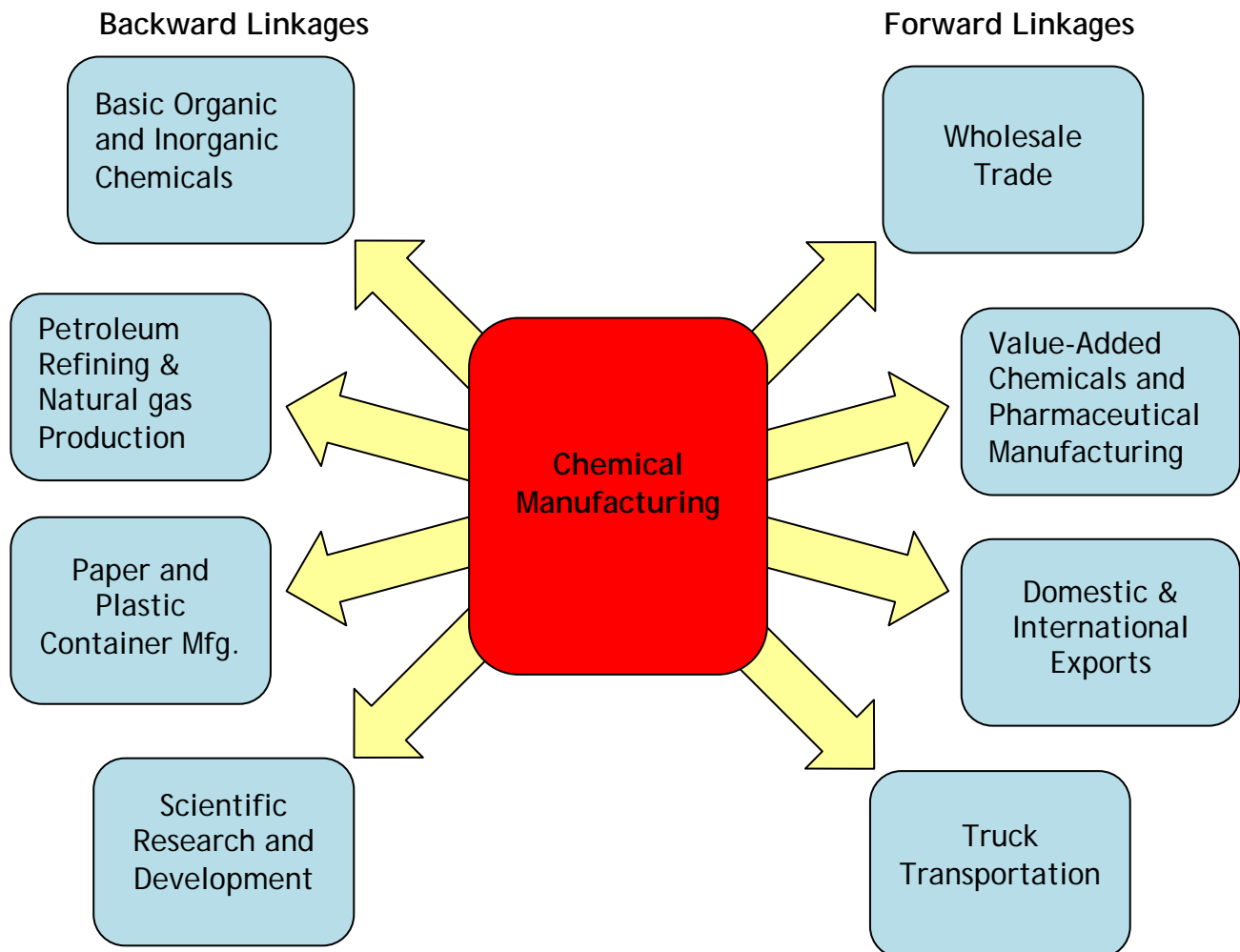
Chemical Manufacturing Impact: Addition of 100 employees			
	Direct Impact	Indirect Impact	Total Impact
Employment	100	329.1	429.1
Labor Income*	\$6.8M	\$14.1M	\$20.9M
Gross Domestic Product	\$34.2M	\$21.9M	\$56.1M

*Labor income includes employee benefits and proprietors income.

Northwest Region

INDUSTRY INTERLINKAGES: CHEMICAL MANUFACTURING

Chemical manufacturing in the Northwest Region employs over 1,300 workers in a diverse range of companies. Backward-linked (supply goods and raw materials to the industry) and forward-linked (produce value-added goods for consumers) activities display the interrelationship between various industries that add value to chemical manufacturing. While the backward linkages are between the suppliers of raw materials to the industry, forward linkages are between the industry and the consumers.



Northwest Region

NOTES

Industry Analysis of a Region's Economic Core

While a business is classified by the primary service or product it creates, another distinction is the market it serves. Companies that target customers outside a region are considered export-based, or core, whereas other businesses mainly serve local customers. Grocery stores, retailers, and doctor's offices are typical examples of local market firms. The distinction between export and local market businesses is important when considering long range economic viability and development.

Export-market industries, by serving customers outside a region, bring new dollars into an economy and form the economic core of the community. Think of manufacturers and large-scale farming. Both industries serve national and global markets and therefore attract new income into the region that is paid out in wages, interests, rents, and profits. By contrast, a local market industry largely churns existing dollars within a region. While local services are absolutely important to a thriving community, seldom can an area's population maintain a robust economy by only selling things to each other; it has to export goods and services to bring in new wealth.

Defining Export-Market Industries

Although some businesses are commonly thought of as exporters, location quotient (LQ) analysis provides a more comprehensive approach. This quotient indicates how concentrated an industry's employment is in a certain area as compared to the U.S. average. If an industry has an LQ of 2.0 then it is twice as concentrated in employment as the U.S. average.

Location Quotient

$\frac{\text{Regional Employment}_{\text{INDUSTRY}}}{\text{Regional Employment}_{\text{TOTAL}}}$	$\frac{\text{U.S. Employment}_{\text{INDUSTRY}}}{\text{U.S. Employment}_{\text{TOTAL}}}$
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Location quotients can help identify regional industries that may be exporting a substantial amount of goods and services to outside markets. If an industry is much more concentrated than the national average, firms are likely creating more products than the local economy can consume. Industries typically considered as primary exporters include:

Large Agriculture and Forestry Operations

Mining

Manufacturing

Management Headquarters

Tourism*

**High retail/accommodation/restaurant LQ associated with destination spots.*



Northwest Region

The list of primary exporters should be supplemented with LQ analysis to determine other industries that may be generating a large amount of income from outside a region. Services such as information technology, design and engineering, and research are often examples in metropolitan areas.

Identifying Industry Patterns

The industries with the highest LQ and combined employment were analyzed in the context of the region's economy and knowledge of individual firms to determine if an industry pattern existed. Employment from 2003-2007 was analyzed to coincide with Missouri's growth period during the last business cycle and to control for more recent recessionary effects. However, third quarter 2009 employment and business closures were reviewed to see if a pattern had greatly diminished due to major structural changes after the period of primary analysis.

Spot Strengths were identified as high LQ and employment sectors where 3 or fewer companies employed over 80 percent of the industry's workforce. Spot firm employment or wage information cannot be disclosed due to confidentiality restrictions in the QCEW program. However, this report does try to identify those firm's connections to larger clusters where applicable.

Spot firms employ a large percentage of workers and attract supply chain industries. These businesses are so prominent in a local economy, think of "factory towns," that the firms can overshadow other regional industries. If a Spot business moves out of an area then the industry concentration (LQ) leaves with it, thereby introducing a vulnerability to the region's economy.

Core Cluster patterns takes into account the number of businesses and employment within the region that make up an industry concentration. Cluster businesses are more diversified in firm count. Three or less firms do not account for over 80 percent of industry employment.

Core clusters benefit from the transfer of knowledge and a shared, skilled workforce that close proximity brings. Supply chains develop to serve these companies and competition keeps prices down. Experienced industry entrepreneurs periodically dream up better products, spin-off new local firms, and grow the economic core of a community.

While all companies are influenced by larger economic trends, having a number of similar businesses in an area helps diversify the risk and rewards as each company focuses on specialized products. These core cluster businesses collectively benefit from supporting services and workforce training that is tailored to common industry needs.

Northwest Region

SOURCES

1. Quarterly Census of Employment and Wages, 2003-2008 Annual Averages, Bureau of Labor Statistics. The location quotient, cluster summaries and chart are based on 2007 employment and 2003-2007 trends to capture information during the last growth cycle and control for recessionary effects. Location quotient analyzed using the BLS Regional Data Analysis Tool (RDAT).
2. Local Employment Dynamics Program, 2008, U.S. Census Bureau.
3. Census of Agriculture, 2007, U.S. Department of Agriculture.
4. IMPLAN Economic Impact Model, 2007, MIG Inc.

Winter 2010

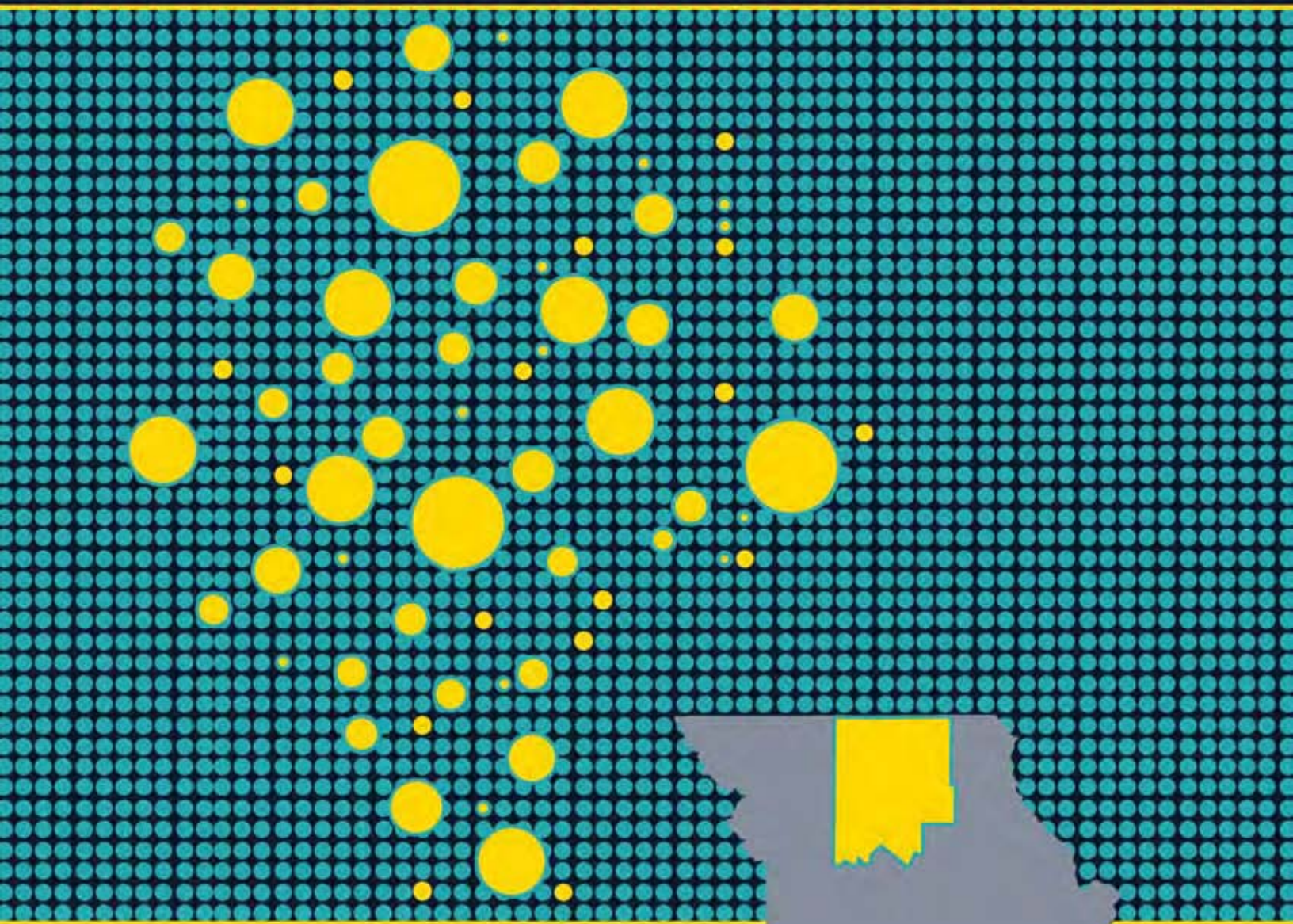
Primary Research: Alan Spell
Graphic Design: Maggie Lear

Missouri Economic Research and Information Center
Department of Economic Development, Division of Business and Community Services



PATTERN ANALYSIS

HIGHLIGHTING INDUSTRY PATTERNS THAT DRIVE NEW
WEALTH IN A REGIONAL ECONOMY



NORTH CENTRAL REGION

AN INTRODUCTION TO INDUSTRY PATTERN ANALYSIS

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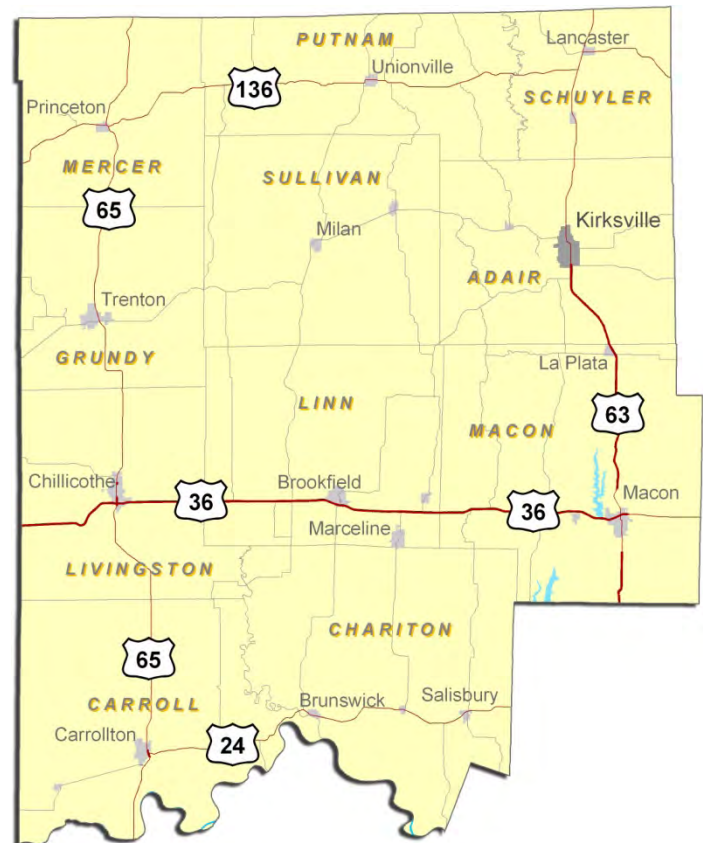
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Pattern analysis highlights the strengths and linkages of area industries and can serve as a starting point for understanding a regional economy. People familiar with company operations know that no two firms have the same business model. Pattern information should ultimately be enhanced by individuals with local business knowledge.

See the **NOTES** section for more details on industry pattern analysis and the methods used in this report.





North Central Region

What comes after “Pattern Recognition?”

Economic and workforce developers have been speaking the “cluster” language for a long time. However, just knowing that a spot strength or core cluster pattern exists is only one step in the process. Here are some additional things to consider:

Group Think

While large, individual businesses will always be important and drive some policy actions, decision-makers can use pattern knowledge to focus efforts on the common problems that related businesses have. This approach makes the best use of limited resources by providing the biggest impact to the most companies.

Customize Help

One size does not fit all when it comes to supporting an industry pattern. Assisting a business cluster may involve specific projects like expanding utilities or broader actions such as helping attract additional knowledge workers. Whatever the needs, the pattern approach can help prioritize actions.

Work on Workforce

Many business location or expansion decisions revolve around issues of available labor. Workforce training geared toward supporting clusters can be very valuable as many of the firms hire workers with similar skill sets. Likewise, talented workers want to locate where clusters of similar businesses offer better odds at finding employment.

Career centers, community colleges, and universities can customize training programs to meet the need of cluster industries for specialized workers.

Spread the Word

Economic and workforce developers can tell the story of how a region’s industries and institutions create clusters of opportunity for existing companies, workers, and new investment. Examples such as the Animal Health Corridor (Missouri-Kansas) and the Plant and Medical Sciences Cluster (St. Louis) are excellent branding campaigns that highlight the combined strengths of businesses, universities, incubators, and workforce to form clusters of growth.

Plan for the Future

The current recession reminds everyone that major structural changes in the economy will occur from time to time. Missouri’s automotive industry is undergoing that change right now. Developers that understand a region’s pattern of industries will be better positioned to promote new opportunities of growth that fit well with an economy’s existing and transforming strengths.

North Central Region

INDUSTRY OVERVIEW

The North Central region has a population of 115,651, which accounts for 1.9 percent of Missouri's total population. Economic centers include Kirksville, where roughly 18 percent of area residents work, to Chillicothe (9.5%), Trenton (5.9%) and Macon (5.8%).* The average wage in 2008 was \$27,623, considerably lower than the state average of \$40,710.

In 2008 non-farm employment for the area was 39,808, which includes public and private sectors. Healthcare and manufacturing were the primary employing industries in the region, accounting for 3 out of every 10 jobs. Although most employment in the primary farming sector is not captured by this measure, over 11,400 people were estimated to be either a farm owner or worker in 2007.** Many of these farmers may also have other jobs, but clearly agriculture in a significant part of this region's economy.

North Central Region Industry Employment 2008				
NAICS	Industry	Annual Avg. Emp.	Perc. Total Emp.	Annual Avg. Wage
11	Agriculture, Forestry, Fishing, and Hunting	1,464	3.7%	\$28,199
21	Mining	20	0.1%	\$37,628
22	Utilities	500	1.3%	\$43,652
23	Construction	1,497	3.8%	\$34,271
31-33	Manufacturing	5,598	14.1%	\$37,140
42	Wholesale Trade	1,409	3.5%	\$32,205
44-45	Retail Trade	5,155	12.9%	\$19,554
48-49	Transportation and Warehousing	1,210	3.0%	\$34,358
51	Information	905	2.3%	\$28,104
52	Finance and Insurance	1,471	3.7%	\$35,573
53	Real Estate and Rental and Leasing	361	0.9%	\$18,739
54	Professional, Scientific, and Technical Services	985	2.5%	\$23,599
55	Management of Companies and Enterprises	296	0.7%	\$56,165
56	Administrative and Support Services	523	1.3%	\$25,163
61	Educational Services	4,867	12.2%	\$31,582
62	Health Care and Social Assistance	6,296	15.8%	\$26,688
71	Arts, Entertainment, and Recreation	409	1.0%	\$13,361
72	Accommodation and Food Services	2,925	7.3%	\$9,514
81	Other Services	1,382	3.5%	\$16,724
92	Public Administration	2,538	6.4%	\$28,827
TOTAL		39,808		\$27,623

* Local Employment Dynamics, U.S. Census Bureau, 2006.

**The most accurate and timely industry employment numbers come from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages program (QCEW). However, reporting requirements for this program excludes most farmers so the USDA 2007 Census of Agriculture is used as an alternative, non-comparative measure.

North Central Region

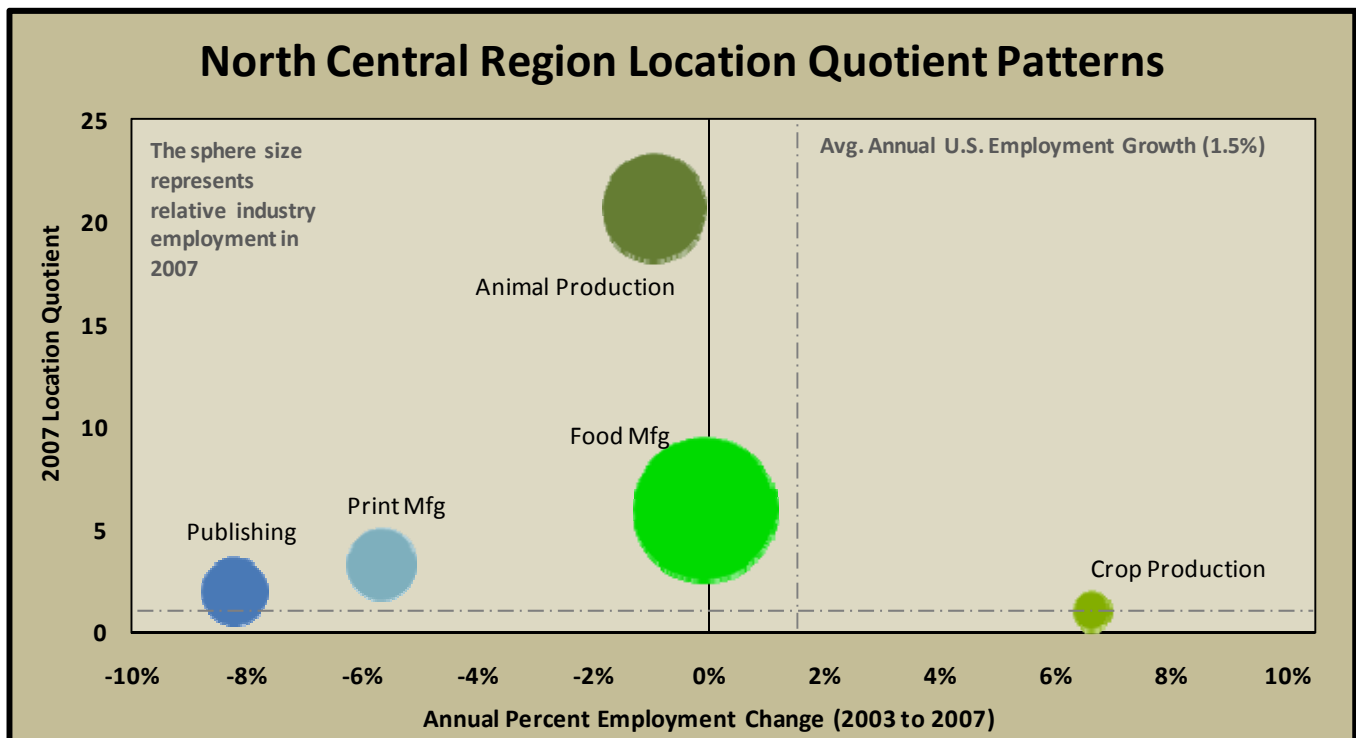
INDUSTRY PATTERNS

Analysis of the North Central region revealed two industry concentration patterns. The Agribusiness and Print industries are highly specialized in this area and represent nearly 16 percent of all private employment.*

Both of these industry patterns are spot strengths in the region as a small number of firms account for the majority of business activity. Agribusiness at the farm level, however, is naturally more diversified as is the large number of supporting industries that rely heavily on the success of agriculture. Most of these pattern industries shrank in employment during the last business growth cycle.

Industry Pattern Type and Location Quotient (LQ)

TYPE	NAICS	INDUSTRY	LQ
Cluster	111	Crop Production	1.0
Spot	112	Animal Production	20.1
Spot	311	Food Manufacturing	6.0
Spot	323	Print Manufacturing	3.4
Spot	511	Publishing Industries	2.0



* Spot industry employment by detailed sector is not reportable due to BLS confidentiality restrictions.



North Central Region

Agribusiness

Crop Production (NAICS 111)

Animal Production (NAICS 112)

Food Manufacturing (NAICS 311)

The agribusiness pattern, comprised of animal and crop producers as well as food manufacturers, represents a significant industry for the North Central region.* Farmers and food manufacturers both benefit from the close proximity which reduces transportation costs. Likewise, many crop farmers produce feedstock which nearby animal producers can benefit from. Firms specializing in transportation services represent a key linkage for this cluster as it sells products to export markets. Specialized farm retailers, wholesalers, and bankers also provide important inputs to this business pattern.

Animal production is highly concentrated in North Central Missouri and is a primary input to food manufacturers. This specialization combined with crop production does offer opportunities for increased wealth generation, especially in foreign markets, once global economies rebound from the Great Recession.

The increasing appetite for Missouri agricultural products by foreign countries was particularly strong toward the end of the last business cycle and even into the first year of the recession. From 2006 to 2008 Missouri exports in combined crop, animal, and food production increased by over 70 percent, while total exports climbed by 0.4 percent. Although commodity prices clearly played a strong role in this increase, the growth is reflective of the higher global demand for these products.

Print Industry

Print Manufacturing (NAICS 323)

Publishing (NAICS 511)

The Print industry in North Central Missouri includes the manufacturing and publishing of books, magazines, and commercial screen printing. Some companies in this region specialize in educational institution and student products. All firms in the print and publishing industry rely on a variety of paper, ink, logistics, and machinery inputs to develop competitive products. Some of the top occupations include print machine operators, prepress technicians, graphic designers, editors, and sales representatives.

* Crop and animal production employment used in the summary and location quotient are from the Quarterly Census of Employment and Wages (QCEW) and does not capture most farm production employment. The U.S. 2007 Census of Agriculture indicated that a combined total of 11,428 farm owners and hired labor worked in the North Central Region but due to different collection methodologies cannot be directly added to the QCEW. However, the Agriculture Census employment numbers do highlight the greater significance of farm production to the region's economy.



North Central Region

Although it is a regional spot pattern, the state has a slight print industry cluster LQ of 1.1 with most other firms located in the Central and Kansas City regions. Declining employment in this industry may be due to a variety of factors, one being the on-going process of most manufacturers to increase technology usage which, in turn, requires fewer operators.

RURAL REGION CHALLENGES

The small number of pattern industries and slow employment growth demonstrated in North Central Missouri is very common in rural regions across the U.S. These areas face challenges such as population out-migration and business consolidation that make economic diversification difficult. A 2009 Kansas City Federal Reserve report^{*} points out these challenges and highlights a couple of rural trends worth consideration:

- *Net migration trends show that middle-aged populations (ages 30-44) are making up an increasingly larger share of rural communities.*

Although rural communities continue to lose younger adults, middle-agers are bucking the trend. These experienced workers, some moving back to hometowns for family reasons or for a smaller-town lifestyle, may be the next entrepreneurs in a local community. A recent Kauffman Foundation survey[†] found that entrepreneurs in high-growth industries tended to be well-educated, experienced, have a family, and be on average 40 years old.

- *Older adults are continuing to relocate to communities with high quality of life factors that include healthcare, education, personal services, and recreation.*

While Florida and the Southwest have long been a destination for retirees, lesser-known communities offering great amenities at a lower cost are gaining ground. Places that offer jobs and continuing education opportunities are also able to attract older adults who are looking to slow down but not completely give up work. These adults can be key sources of business leadership and experience.

^{*} Henderson, Jason. 2009. "Prospect for Rural Recovery," *Main Street Economist*, Federal Reserve Bank of Kansas City, Issue IV.

[†] Wadhwa, Vivek, Aggarwal, Raj, Holly, Krisztina, and Salkever, Alex. *The Anatomy of an Entrepreneur: Family Background and Motivation*. 2009. The Ewing Marion Kauffman Foundation.

North Central Region

INDUSTRY CONTRIBUTION IMPACT: FOOD MANUFACTURING

Pattern recognition is important since changes to business production can have broad regional impacts across a range of linked industries and institutions. Food manufacturing is analyzed in this example of how those connections positively influence the area's economy.

Food manufacturing includes the primary inputs of crop farming, and animal slaughter/processing among other things. The industry produces grain, oil, and meat products that can be a final good or an input to other food products sold in export markets, thereby bringing additional money into the regional economy.

Food manufacturing workers are among the highest paid in the region. An addition of 100 employees in food manufacturing creates an estimated total of 255 jobs paying \$7.1 million in salaries and contributing over \$10.9 million to the gross state product. The value-added per worker in food manufacturing and supporting industries is \$42,745.



Food Manufacturing Impact: Addition of 100 employees

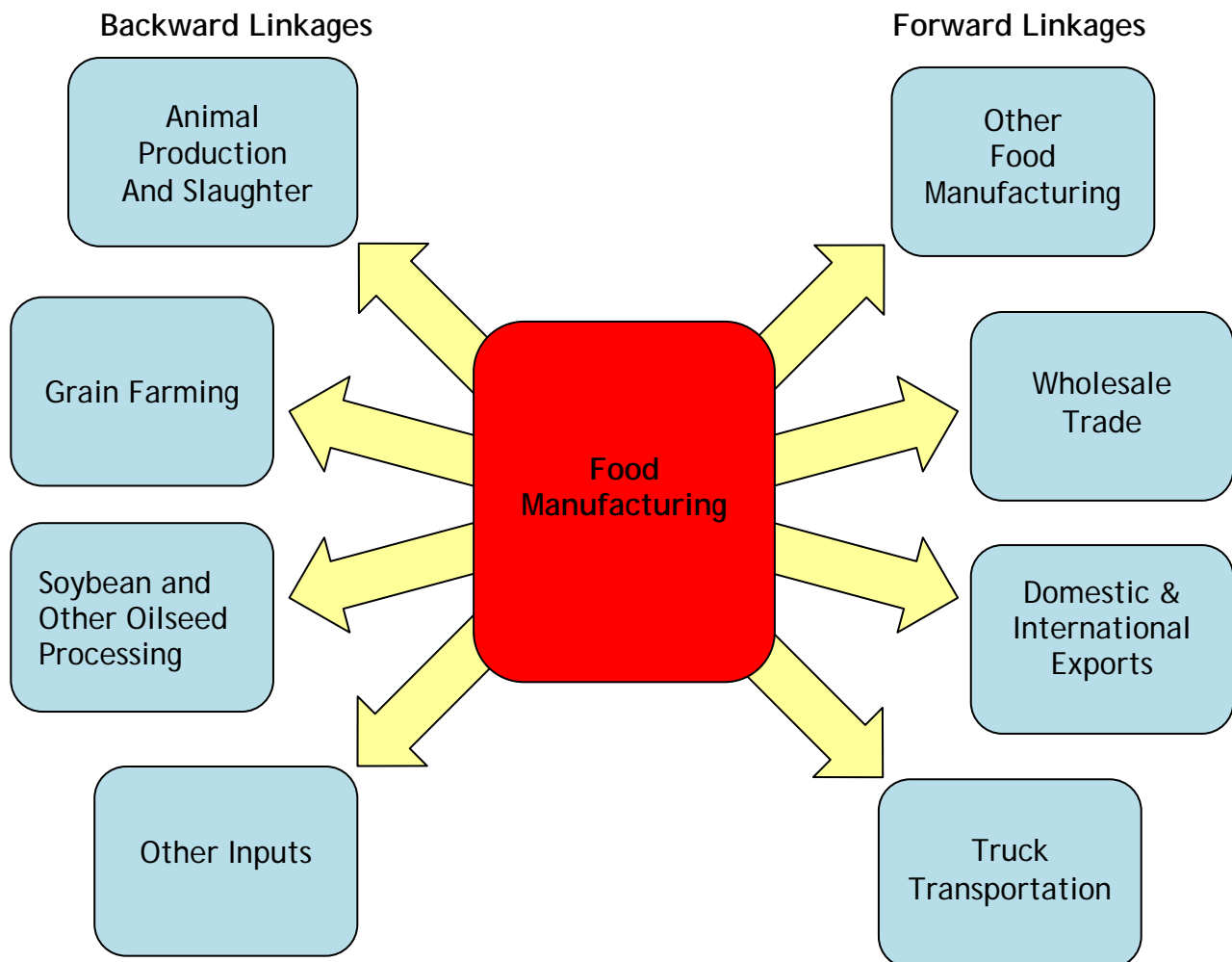
	Direct Impact	Indirect Impact	Total Impact
Employment	100	155	255
Labor Income*	\$3.0M	\$4.1M	\$7.1M
Gross Domestic Product	\$3.5M	\$7.4M	\$10.9M

*Labor income includes employee benefits and proprietors income.

North Central Region

INDUSTRY INTERLINKAGES: FOOD MANUFACTURING

Food manufacturers in the North Central region employ a large number of workers. Backward-linked (supply goods and raw materials to the industry) and forward-linked (produce value-added goods for consumers) activities display the interrelationship between various industries that add value to food manufacturing. While the backward linkages are between the suppliers of raw materials to the industry, forward linkages are between the industry and the consumers.



North Central Region

NOTES

Industry Analysis of a Region's Economic Core

While a business is classified by the primary service or product it creates, another distinction is the market it serves. Companies that target customers outside a region are considered export-based, or core, whereas other businesses mainly serve local customers. Grocery stores, retailers, and doctor's offices are typical examples of local market firms. The distinction between export and local market businesses is important when considering long range economic viability and development.

Export-market industries, by serving customers outside a region, bring new dollars into an economy and form the economic core of the community. Think of manufacturers and large-scale farming. Both industries serve national and global markets and therefore attract new income into the region that is paid out in wages, interests, rents, and profits. By contrast, a local market industry largely churns existing dollars within a region. While local services are absolutely important to a thriving community, seldom can an area's population maintain a robust economy by only selling things to each other; it has to export goods and services to bring in new wealth.

Defining Export-Market Industries

Although some businesses are commonly thought of as exporters, location quotient (LQ) analysis provides a more comprehensive approach. This quotient indicates how concentrated an industry's employment is in a certain area as compared to the U.S. average. If an industry has an LQ of 2.0 then it is twice as concentrated in employment as the U.S. average.

Location Quotient

$\frac{\text{Regional Employment}_{\text{INDUSTRY}}}{\text{Regional Employment}_{\text{TOTAL}}}$	$\frac{\text{U.S. Employment}_{\text{INDUSTRY}}}{\text{U.S. Employment}_{\text{TOTAL}}}$
--	--

Location quotients can help identify regional industries that may be exporting a substantial amount of goods and services to outside markets. If an industry is much more concentrated than the national average, firms are likely creating more products than the local economy can consume. Industries typically considered as primary exporters include:

Large Agriculture and Forestry Operations

Mining

Manufacturing

Management Headquarters

Tourism*

**High retail/restaurant LQ associated with destination spots.*



North Central Region

The list of primary exporters should be supplemented with LQ analysis to determine other industries that may be generating a large amount of income from outside a region. Services such as information technology, design and engineering, and research are often examples in metropolitan areas.

Identifying Industry Patterns

The industries with the highest LQ and combined employment were analyzed in the context of the region's economy and knowledge of individual firms to determine if an industry pattern existed. Employment from 2003-2007 was analyzed to coincide with Missouri's growth period during the last business cycle and to control for more recent recessionary effects. However, first quarter 2009 employment and business closures were reviewed to see if a pattern had greatly diminished due to major structural changes after the period of primary analysis.

Spot Strengths were identified as high LQ and employment sectors where 3 or fewer companies employed over 80 percent of the industry's workforce. Spot firm employment or wage information cannot be disclosed due to confidentiality restrictions in the QCEW program. However, this report does try to identify those firm's connections to larger clusters where applicable.

Spot firms employ a large percentage of workers and attract supply chain industries. These businesses are so prominent in a local economy, think of "factory towns," that the firms can overshadow other regional industries. If a Spot business moves out of an area then the industry concentration (LQ) leaves with it, thereby introducing a vulnerability to the region's economy.

Core Cluster patterns takes into account the number of businesses and employment within the region that make up an industry concentration. Cluster businesses are more diversified in firm count. Three or less firms do not account for over 80 percent of industry employment.

Core clusters benefit from the transfer of knowledge and a shared, skilled workforce that close proximity brings. Supply chains develop to serve these companies and competition keeps prices down. Experienced industry entrepreneurs periodically dream up better products, spin-off new local firms, and grow the economic core of a community.

While all companies are influenced by larger economic trends, having a number of similar businesses in an area helps diversify the risk and rewards as each company focuses on specialized products. These core cluster businesses collectively benefit from supporting services and workforce training that is tailored to common industry needs.



North Central Region

SOURCES

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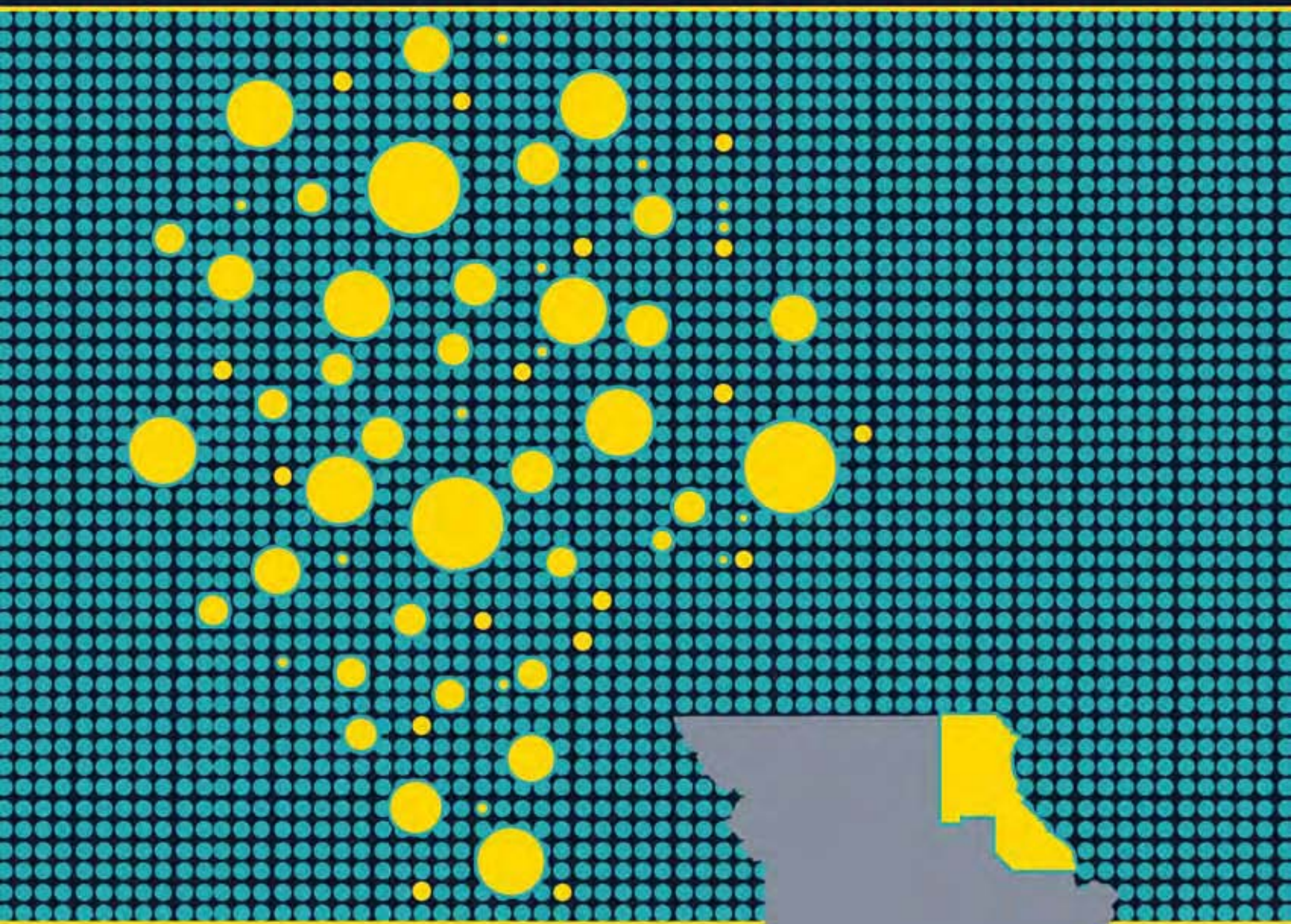
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Department of Economic Development, Division of Business and Community Services



PATTERN ANALYSIS

HIGHLIGHTING INDUSTRY PATTERNS THAT DRIVE NEW
WEALTH IN A REGIONAL ECONOMY



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AN INTRODUCTION TO INDUSTRY PATTERN ANALYSIS

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- **Spot Strengths** of large sector employment, typically in one or two firms, and
- **Core Clusters** of employment across a mix of similar or linked industries.

Recognizing spot strengths and core cluster patterns is important as these collectively large employers attract new income to a region. Knowing these industries, and the shared supply-chain and labor issues these companies have, can aid economic and workforce developers in the crafting of policies for the broadest impact.

Pattern analysis highlights the strengths and linkages of area industries and can serve as a starting point for understanding a regional economy. People familiar with company operations know that no two firms have the same business model. Pattern information should ultimately be enhanced by individuals with local business knowledge.

See the **NOTES** section for more details on industry pattern analysis and the methods used in this report.





Northeast Region

What comes after “Pattern Recognition?”

Economic and workforce developers have been speaking the “cluster” language for a long time. However, just knowing that a spot strength or core cluster pattern exists is only one step in the process. Here are some additional things to consider:

Group Think

While large, individual businesses will always be important and drive some policy actions, decision-makers can use pattern knowledge to focus efforts on the common problems that related businesses have. This approach makes the best use of limited resources by providing the biggest impact to the most companies.

Customize Help

One size does not fit all when it comes to supporting an industry pattern. Assisting a business cluster may involve specific projects like expanding utilities or broader actions such as helping attract additional knowledge workers. Whatever the needs, the pattern approach can help prioritize actions.

Work on Workforce

Many business location or expansion decisions revolve around issues of available labor. Workforce training geared toward supporting clusters can be very valuable as many of the firms hire workers with similar skill sets. Likewise, talented workers want to locate where clusters of similar businesses offer better odds at finding employment.

Career centers, community colleges, and universities can customize training programs to meet the need of cluster industries for specialized workers.

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Economic and workforce developers can tell the story of how a region’s industries and institutions create clusters of opportunity for existing companies, workers, and new investment. Examples such as the Animal Health Corridor (Missouri-Kansas) and the Plant and Medical Sciences Cluster (St. Louis) are excellent branding campaigns that highlight the combined strengths of businesses, universities, incubators, and workforce to form clusters of growth.

Plan for the Future

The current recession reminds everyone that major structural changes in the economy will occur from time to time. Missouri’s automotive industry is undergoing that change right now. Developers that understand a region’s pattern of industries will be better positioned to promote new opportunities of growth that fit well with an economy’s existing and transforming strengths.

Northeast Region

INDUSTRY OVERVIEW

The Northeast region has a population of 90,231, which accounts for 1.5 percent of Missouri's total population. Economic centers include Hannibal, where roughly 25 percent of area residents work, to Quincy, IL (5.4%) and Louisiana, MO (4.2%).* The average wage in 2008 was \$28,266, considerably lower than the state average of \$40,710.

In 2008 non-farm employment for the area was 30,882, which includes public and private sectors. Healthcare, manufacturing, and retail were the primary employing industries in the region, accounting for 45 percent of all jobs. Although most employment in the primary farming sector is not captured by this measure, over 6,600 people were estimated to be either a farm owner or worker in 2007.** Many of these farmers may also have other jobs, but clearly agriculture in a significant part of this region's economy.

Northeast Region Industry Employment 2008				
NAICS	Industry	Annual Avg. Emp.	Perc. Total Emp.	Annual Avg. Wage
11	Agriculture, Forestry, Fishing, and Hunting	594	1.9%	\$22,507
21	Mining	147	0.5%	\$36,465
22	Utilities	321	1.0%	\$53,812
23	Construction	1,498	4.8%	\$38,981
31-33	Manufacturing	4,345	14.1%	\$40,576
42	Wholesale Trade	1,215	3.9%	\$34,538
44-45	Retail Trade	4,325	14.0%	\$18,988
48-49	Transportation and Warehousing	1,213	3.9%	\$33,517
51	Information	391	1.3%	\$28,507
52	Finance and Insurance	986	3.2%	\$33,082
53	Real Estate and Rental and Leasing	128	0.4%	\$15,394
54	Professional, Scientific, and Technical Services	624	2.0%	\$32,047
55	Management of Companies and Enterprises	202	0.7%	\$45,501
56	Administrative and Support Services	578	1.9%	\$24,365
61	Educational Services	2,864	9.3%	\$28,151
62	Health Care and Social Assistance	5,274	17.1%	\$28,692
71	Arts, Entertainment, and Recreation	656	2.1%	\$14,963
72	Accommodation and Food Services	2,140	6.9%	\$10,393
81	Other Services	1,108	3.6%	\$19,241
92	Public Administration	2,276	7.4%	\$27,776
TOTAL		30,882		\$28,266

* Local Employment Dynamics, U.S. Census Bureau, 2006.

**The most accurate and timely industry employment numbers come from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages program (QCEW). However, reporting requirements for this program excludes most farmers so the USDA 2007 Census of Agriculture is used as an alternative, non-comparative measure.

Northeast Region

INDUSTRY PATTERNS

Industry pattern analysis revealed some interesting core clusters and spot strengths in Northeast Missouri. Three diverse clusters of Agribusiness, Metal/Machinery Mfg., and Truck Transportation were identified along with additional manufacturing strengths and a concentration in Amusement services.

These core cluster and spot industries account for 18 percent of all private employment in the region.* Patterns demonstrate the heavy importance that agribusiness and manufacturing play in the region along with the linkages these industries have with Truck Transportation. Amusement activities highlight the role of tourism, especially in Hannibal and around Mark Twain Lake.

Industry Pattern Type and Location Quotient (LQ)

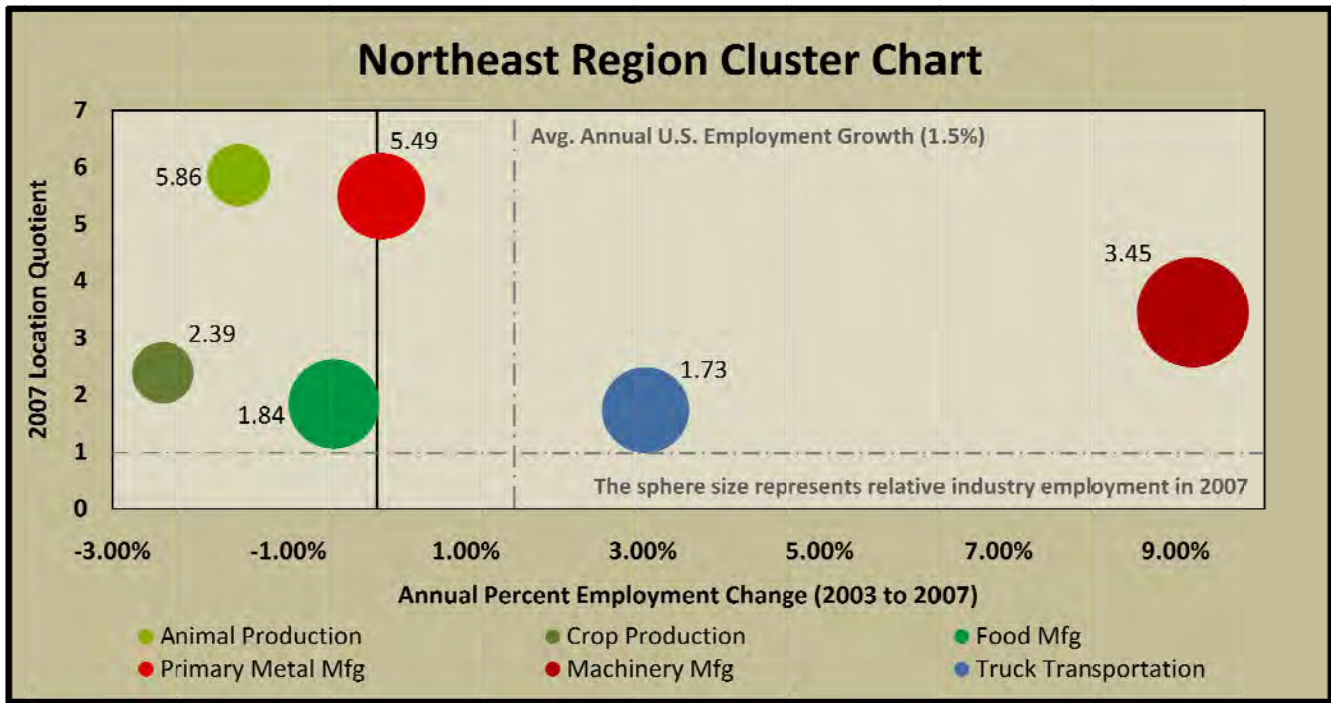
TYPE	NAICS	INDUSTRY	LQ
Cluster	111	Crop production	2.4
Cluster	112	Animal Production	5.9
Cluster	311	Food manufacturing	1.8
Cluster	331	Primary Metal Mfg.	5.5
Cluster	333	Machinery Mfg.	3.4
Cluster	484	Truck Transportation	1.7
Spot	325	Chemical Mfg.	2.6
Spot	326	Plastics/Rubber Products Mfg.	1.8
Spot	713	Amusements, Gambling, and Rec.	1.9

Cluster Summary

Cluster	Agribusiness			Metal/Machinery Mfg.		Truck Transp.
Industry	Crop Production	Animal Production	Food Mfg.	Primary Metal Mfg.	Machinery Mfg.	Truck Transp.
Location Quotient	2.39	5.86	1.84	5.49	3.45	1.73
Employment	268	272	566	522	851	520
Avg. Wage	\$21,429	\$22,080	\$45,987	\$39,953	\$32,929	\$31,451
Description	Engaged in growing crops mainly for food and fiber, and includes farms, orchards, groves, etc.	Involved in the raising of fattening animals for the sale of animals or animal products.	Transformation of livestock or agricultural goods into products for intermediate of final consumption.	Smelting and/or refining ferrous and nonferrous metals from ore, pig, or scrap.	Creating end products that apply mechanical force through forging, stamping, and bending processes.	Provides over-the-road transportation of cargo using motor vehicles, such as trucks and trailers.

* Spot industry employment by detailed sector is not reportable due to BLS confidentiality restrictions.

Northeast Region



Agribusiness Cluster

Crop Production (NAICS 111)

Animal Production (NAICS 112)

Food Manufacturing (NAICS 311)

The agribusiness cluster, comprised of animal and crop producers as well as food manufacturers, represents a significant and diversified industry for the Northeast region.* Farmers and food manufacturers both benefit from the close proximity which reduces transportation costs. Likewise, many crop farmers produce feedstock which nearby animal producers can benefit from. Firms specializing in trucking, rail, and port service represent a key linkage for this cluster as it sells products to export markets. Specialized farm retailers and wholesalers also provide important inputs to this business cluster.

Crop producers, mainly focused on soybean and corn acreage, have benefited from increases in commodity prices spurred by foreign demand and biofuel mandates. The recession has recently weakened prices but demand will hopefully rebound with the global economy. The

* Crop and animal production employment used in the summary and location quotient are from the Quarterly Census of Employment and Wages (QCEW) and does not capture most farm production employment. The U.S. 2007 Census of Agriculture indicated that a combined total of 6,624 farm owners and hired labor worked in the Northeast Region but due to different collection methodologies cannot be directly added to the QCEW. However, the Agriculture Census employment numbers do highlight the greater significance of farm production to the region's economy.



Northeast Region

northern Missouri energy producers of ethanol and biodiesel are strongly linked to this cluster and may see growth pick back up with a rise in oil prices and new federal initiatives. Animal producers are 5 times more concentrated in the Northeast than the rest of the nation and represent the highest location quotient (LQ) of all agribusiness industries.

As the Cluster Chart illustrates, the agribusiness industry did not see employment growth from 2003 to 2007. Part of reason may be the on-going decline in farm employment based on productivity gains. Agribusiness, like manufacturing, is becoming more high-tech and therefore continually needs fewer and fewer workers to produce the same output. It is noteworthy that from 2007 to 2008 this cluster grew 2.9 percent in employment while the region as a whole increased by only 0.5 percent.

Metal and Machinery Manufacturing Cluster

Primary Metal Manufacturing (NAICS 331)

Machinery Manufacturing (NAICS 333)

The Primary Metal and Machinery Manufacturing Cluster is highly specialized in the Northeast region with LQs of 5.49 and 3.45 respectively. Machinery manufacturing employment, in particular, grew over 9 percent a year from 2003 to 2007 while U.S. annual growth was only 1.5 percent.

This manufacturing cluster is primarily engaged in the export of value-added industrial inputs, serving intermediate demands in national and foreign markets. The sector declined in employment during 2008 which is not surprising given the overall global reduction in manufacturing output. Most firms do not appear to be linked to the automotive sector which is seeing more drastic, long-term changes. This fact may help this sector rebound more quickly once the economy turns around.

Truck Transportation Cluster

Truck Transportation (NAICS 484)

Truck transportation activities can serve regional markets with short-haul services (typically less than 100 miles) and national markets with longer hauls. Trucking services provide a key logistics input for many commodity-based and manufacturing industries. In the Northeast region, the majority of small-to-mid sized firms specialize in long-haul activities, thereby generating income from companies outside the region.

The Truck Transportation Cluster exceeded the U.S. growth rate from 2003 to 2007 with annual employment increases just over 3 percent, a rate almost matched in 2008 despite the recession.

Northeast Region

INDUSTRY CONTRIBUTION IMPACT: PRIMARY METAL MANUFACTURING

Pattern recognition is important since changes to business production can have broad regional impacts across a range of linked industries and institutions. Primary metal manufacturing is analyzed in this example of how those connections positively influence the area's economy.

Primary metal manufacturing consists of ferrous (containing iron) and non-ferrous metal production and processing, foundries, steel product manufacturing and iron, steel mills and ferroalloy manufacturing. The industry makes basic metal parts that are typically inputs to other final products sold in export markets, thereby bringing additional money into the regional economy.

Primary metal manufacturing workers are among the highest paid in the region at \$39,953. An addition of 100 employees in primary metal manufacturing creates an estimated total of 354 jobs paying \$13.6 million in salaries and contributing over \$23.6 million to the gross state product. The value-added per worker in primary metal manufacturing and supporting industries is \$66,742.



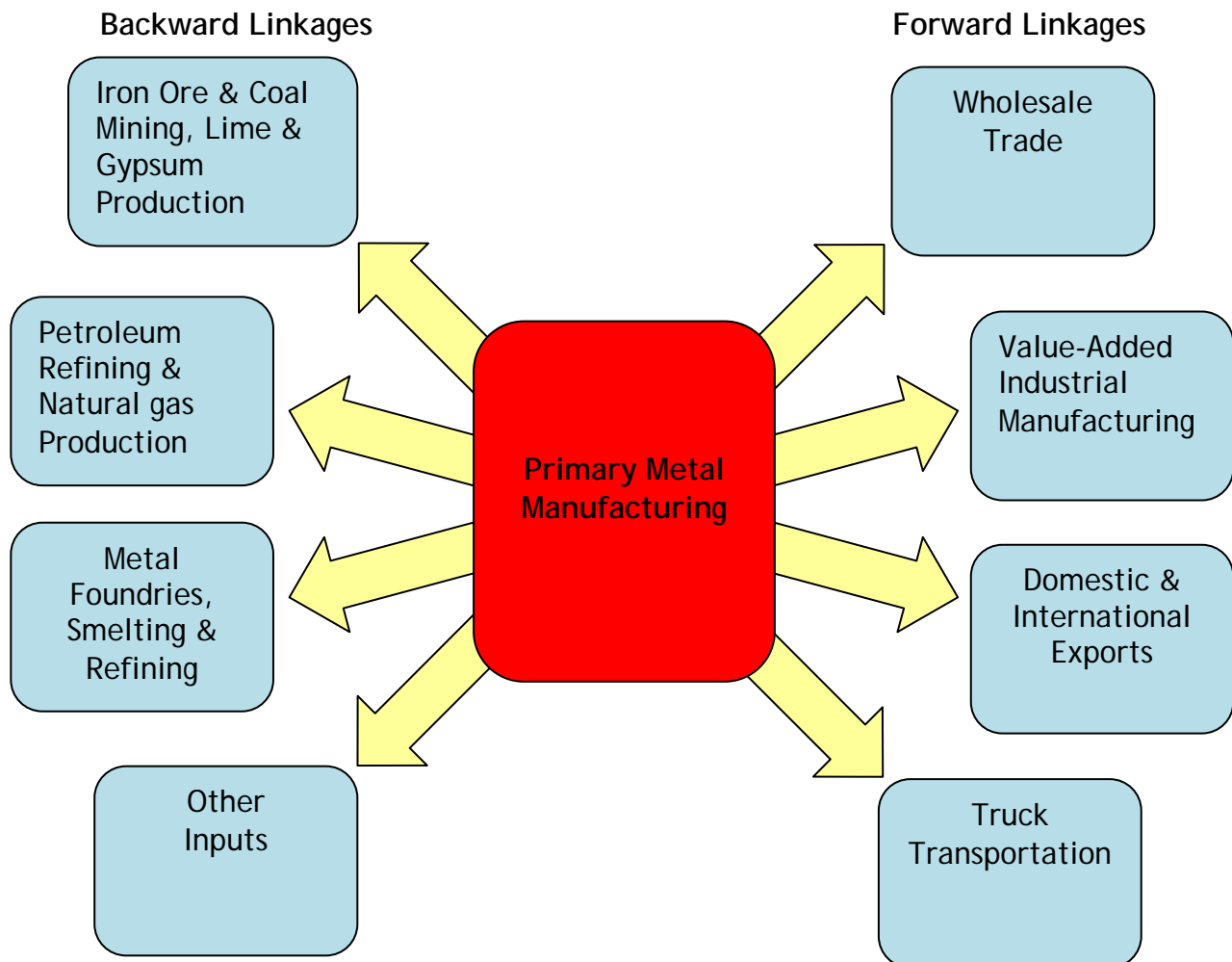
Primary Metal Manufacturing Impact: Addition of 100 employees			
	Direct Impact	Indirect Impact	Total Impact
Employment	100	253.8	353.8
Labor Income*	\$4.0M	\$9.6M	\$13.6M
Gross Domestic Product	\$7.0M	\$16.6M	\$23.6M

*Labor income includes employee benefits and proprietors income.

Northeast Region

INDUSTRY INTERLINKAGES: PRIMARY METAL MANUFACTURING

Primary metal manufacturing in the Northeast region employs 522 workers and directly creates \$7 million in Gross Domestic Product. Backward-linked (supply goods and raw materials to the industry) and forward-linked (produce value-added goods for consumers) activities display the interrelationship between various industries that add value to primary metal manufacturing. While the backward linkages are between the suppliers of raw materials to the industry, forward linkages are between the industry and the consumers.



Northeast Region

NOTES

Industry Analysis of a Region's Economic Core

While a business is classified by the primary service or product it creates, another distinction is the market it serves. Companies that target customers outside a region are considered export-based, or core, whereas other businesses mainly serve local customers. Grocery stores, retailers, and doctor's offices are typical examples of local market firms. The distinction between export and local market businesses is important when considering long range economic viability and development.

Export-market industries, by serving customers outside a region, bring new dollars into an economy and form the economic core of the community. Think of manufacturers and large-scale farming. Both industries serve national and global markets and therefore attract new income into the region that is paid out in wages, interests, rents, and profits. By contrast, a local market industry largely churns existing dollars within a region. While local services are absolutely important to a thriving community, seldom can an area's population maintain a robust economy by only selling things to each other; it has to export goods and services to bring in new wealth.

Defining Export-Market Industries

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Manufacturing

Management Headquarters

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**High retail/restaurant LQ associated with destination spots.*



Northeast Region

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Northeast Region

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PATTERN ANALYSIS

HIGHLIGHTING INDUSTRY PATTERNS THAT DRIVE NEW
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KANSAS CITY REGION



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Kansas City Region

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Customize Help

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Kansas City Region

INDUSTRY OVERVIEW

The Greater Kansas City region is the second most populated area in Missouri with 1,172,224 residents, which accounts for 20% of the entire state's population. There are 544,639 employed people in the region, coming mostly from the Kansas City Metro Area*.

This region has a strong mix of high-growth industries, including Computer Systems Design, Architectural and Engineering Services, and Data Processing, to name a few. It is also home to seven Fortune 1000 companies, as well as a number of other businesses that contribute greatly to the local, regional, and state economies.

As the national leader in the animal health and nutrition industry, KC area companies account for nearly 32% of total sales in the \$19 billion global animal health market[†]. The region has a strong concentration in other key industries as well, such as Motor Vehicle Manufacturing, Telecommunications, and Data Processing.

Kansas City (MO) Region Industry Employment 2008				
NAICS	Industry	Annual Average Emp.	Percent Total Emp.	Annual Average Wage
11	Agriculture, Forestry, Fishing, and Hunting	810	0.1%	\$30,637
21	Mining	326	0.1%	\$57,346
22	Utilities	4,324	0.8%	\$73,177
23	Construction	29,515	5.4%	\$52,120
31-33	Manufacturing	44,718	8.2%	\$52,102
42	Wholesale Trade	24,748	4.5%	\$54,440
44-45	Retail Trade	59,244	10.9%	\$24,926
48-49	Transportation and Warehousing	25,997	4.8%	\$40,706
51	Information	21,110	3.9%	\$56,110
52	Finance and Insurance	29,453	5.4%	\$62,036
53	Real Estate and Rental and Leasing	10,151	1.9%	\$34,479
54	Professional, Scientific, and Technical Services	36,003	6.6%	\$71,669
55	Management of Companies and Enterprises	10,604	1.9%	\$77,463
56	Administrative and Support Services	28,811	5.3%	\$28,682
61	Educational Services	42,313	7.8%	\$37,858
62	Health Care and Social Assistance	69,296	12.7%	\$43,606
71	Arts, Entertainment, and Recreation	12,594	2.3%	\$35,115
72	Accommodation and Food Services	48,895	9.0%	\$15,773
81	Other Services	16,869	3.1%	\$28,858
92	Public Administration	28,860	5.3%	\$52,011
	TOTAL	544,639		\$43,194

* Local Employment Dynamics, U.S. Census Bureau, 2008

[†] Source: Kansas City Area Development Council

Kansas City Region

INDUSTRY PATTERNS

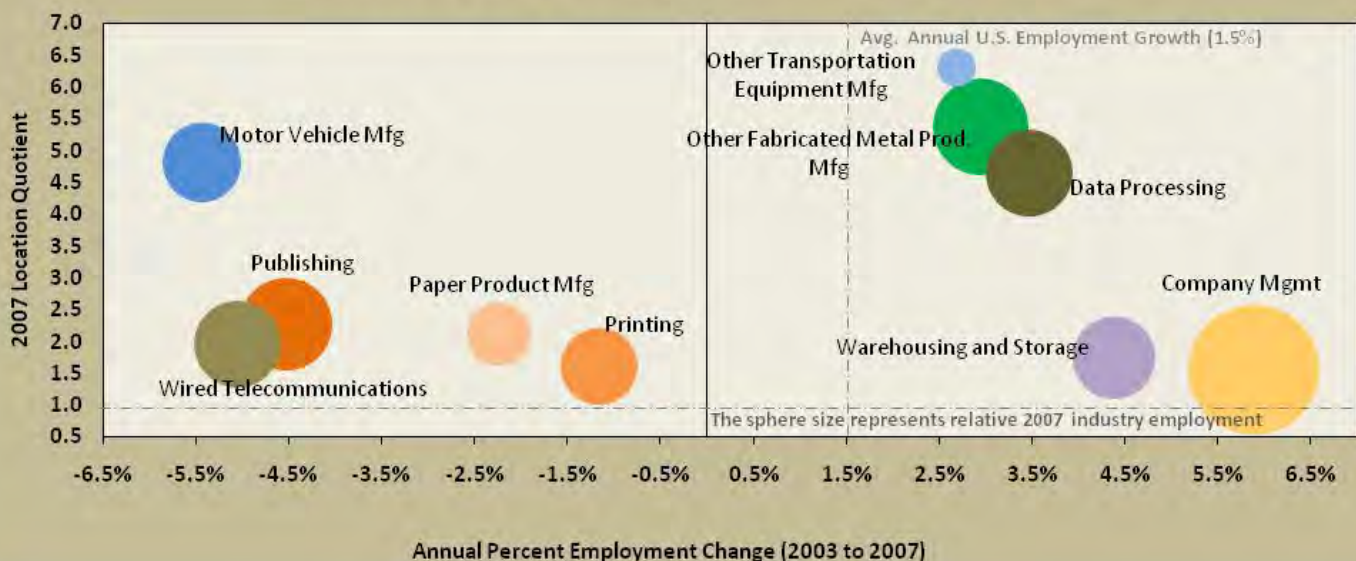
The Kansas City region, with its diverse economy, is well-suited for supporting a number of industries.

While new and emerging technologies are highly targeted by local development groups, a number of core industries continue to support the base of Kansas City's economy. Even though some of these industries have been affected by the recession, they still represent a significant portion of the region's total employment at 49,845. Collectively these ten industry patterns make up nearly 10 percent of the Kansas City region's private employment.

Industry Pattern Type and Location Quotient (LQ)

TYPE	NAICS	INDUSTRY	LQ
Cluster	3222	Paper Product Mfg.	2.1
Cluster	3231	Printing and Related Support Activities	1.6
Spot	5111	Newspaper, Book, and Directory Publishers	2.3
Spot	3329	Other Fabricated Metal Prod. Mfg.	5.4
Cluster	4931	Warehousing and Storage	1.7
Spot	3361	Motor Vehicle Mfg.	4.8
Spot	3369	Other Transportation Equipment Mfg.	6.3
Spot	5171	Wired Telecommunications Carriers	2.0
Spot	5182	Data Processing	4.7
Cluster	5511	Company Management	1.6

Kansas City Region Top Location Quotient Patterns



Kansas City Region

Paper Products Core Cluster

Converted Paper Product Manufacturing (NAICS 3222)

Printing and Related Support Activities (NAICS 3231)

Newspaper, Periodical, Book, and Directory Publishers (NAICS 5111) - SPOT STRENGTH

Subgroup of Firms in:

Company Management (NAICS 5511)

The Paper Products Core Cluster consists of three distinct NAICS groupings that have common industry linkages and together employ over 13,000 workers. Converted Paper Product Manufacturing consists of companies engaged in converting paper or paperboard into boxes and containers without actually manufacturing paper or paperboard. Companies in Printing and Related Support Activities primarily engage in printing on apparel and textile products, paper, metal, glass, plastics and other materials. These establishments do not manufacture the stock that they print.

Newspaper, Periodical, Book, and Directory Publishers is the largest and most concentrated industry in the Paper Products core cluster, and by itself is a spot strength. Greeting card publishers are included in this industry, and are a major contributor to the region's economy. This industry had employment losses that exceeded the national average between 2003 and 2007 in the Kansas City Region. With the recession causing a drop in ad revenues for newspapers and magazines, parts of this industry could continue to see a decline in employment. This is currently an industry in transition as many print publications begin to rely more heavily on web content.

All three industries in this cluster lost employment between 2003 and 2007. However, these industries still have concentrations higher than the national average, and should continue to be considered a key part of Kansas City's regional economy.

Fabricated Metal Product Manufacturing Spot Strength

Other Fabricated Metal Product Manufacturing (NAICS 3329)

A **spot strength** for the Kansas City region, Fabricated Metal Product Manufacturing is made up of one industry. Other Fabricated Metal Product Manufacturing has the 2nd highest concentration of all spot/cluster industries and was 4th in terms of average annual employment growth. A significant portion of this spot strength is dedicated to supplying defense and national security markets.

SPOT STRENGTH:

*High LQ and
employment sectors
where 3 or fewer
companies employed
over 80 percent of the
industry's workforce.*

Warehousing and Storage

Warehousing and Storage (NAICS 4931)

Warehousing and Storage companies act as a crucial support element to a wide variety of industries, ranging from department stores and food distribution to office supplies and musical instruments. The logistics services they offer can include labeling, packaging,



Kansas City Region

inventory control, and transportation arrangement. While they don't manufacture or sell any of the goods they handle, they provide the means by which these goods make it to the consumer. This industry typically pays annual wages over \$30,000.

Transportation Equipment Manufacturing Spot Strength

Motor Vehicle Manufacturing (NAICS 3361)

Other Transportation Equipment Manufacturing (NAICS 3369)

Subgroup of Firms in:

Company Management (NAICS 5511)

Motor Vehicle Manufacturing and Other Transportation Equipment Manufacturing combine to make up the Transportation Equipment Manufacturing pattern. Since Transportation Equipment Manufacturing has so few companies that make up the majority of employment, it is considered a spot strength.

While overall numbers are strong, this spot strength has been vulnerable to recessionary effects. Between 2003 and 2007, Motor Vehicle Manufacturing for the region lost over 20 percent of its employment. Even with this loss, and with Other Transportation Equipment Manufacturing holding steady, this spot strength currently maintains a concentration over 5 times that of the national average.

Motor Vehicle Manufacturing has been on the decline nationwide, but continues to look toward emerging trends for future growth opportunities. In September of 2009, the U.S. Department of Energy awarded the Ford Motor Company a loan for \$5.9 billion dollars. The loan is part of the Advanced Technology Vehicles Manufacturing program, and will help Ford produce more fuel-efficient vehicles. This will enable the company to remain competitive in a global market that is increasingly more mindful of the harmful effects of vehicle emissions.

Information Services Core Cluster

Wired Telecommunications Carriers (NAICS 5171) SPOT STRENGTH

Data Processing, Hosting, and Related Services (NAICS 5182) SPOT STRENGTH

Subgroup of Firms in:

Company Management (NAICS 5511)

Though it's not the most concentrated of the core clusters, Information Services does have a significant employment impact in the Kansas City Region. This core cluster contains a mix of traditional and more modern means of conveying information.

Wired Telecommunications Carriers includes companies that operate, maintain, or provide access to facilities for transmission of voice, data, text, sounds, and video using wired networks. Local and long-distance telephone carriers fall into this category. Between 2003 and 2007, the Kansas City region has seen a decrease in employment and in concentration. Nevertheless, this industry's strong regional presence and high concentration in a few companies continues to make it a regional spot strength. A subgroup of firms in Company Management further bolsters this industry's regional strength.

Kansas City Region

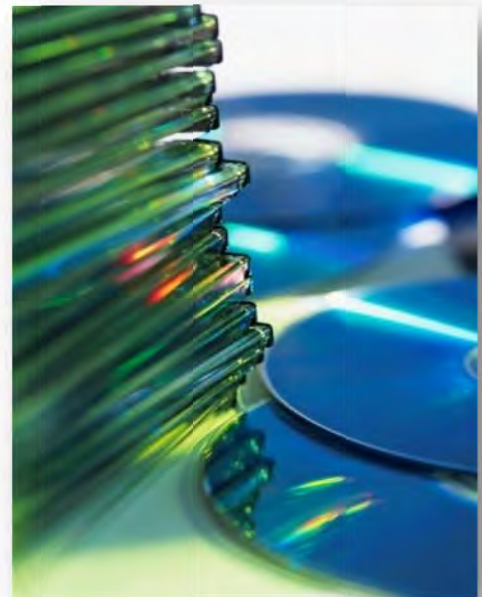
Data Processing, Hosting, and Related Services establishments engage in providing infrastructure for hosting or data processing services. This includes web hosting, media streaming services, and computer time rental. This industry gained employment and showed an increase in concentration between 2003 and 2007. Average annual wages in this industry's subsector are over \$60,000 for the region. Markets served by this industry include financial services, communications, and healthcare industries.

INDUSTRY CONTRIBUTION IMPACT: DATA PROCESSING

Pattern recognition is important since changes to business production can have broad regional impacts across a range of linked industries and institutions. Data processing is analyzed in this example of how those connections positively influence the area's economy.

Data processing consists of internet, fiber-optics, communication networking, multimedia software, hardware, media storage and data security. The industry primarily processes data that are typically inputs to other final products and services sold on internet and export markets, thereby bringing additional money into the regional economy.

Data processing workers enjoy wages that are above the regional average. An addition of 100 employees in data processing creates an estimated total of 232 jobs paying \$11.9 million in salaries and contributing over \$17.4 million to the gross state product. The value-added per worker in data processing and supporting industries is \$74,871.



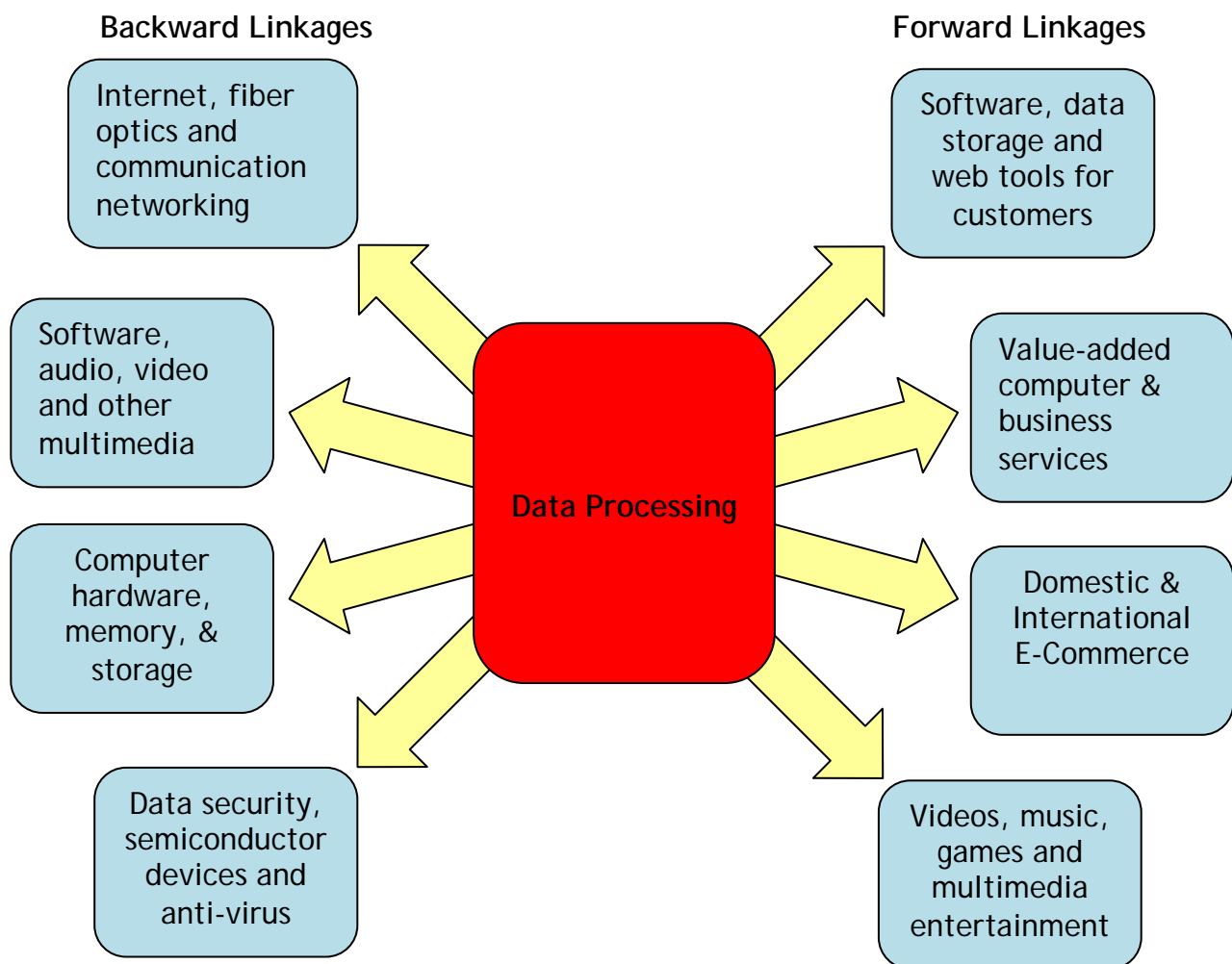
Data Processing Impact: Addition of 100 employees			
	Direct Impact	Indirect Impact	Total Impact
Employment	100	132.4	232.4
Labor Income [‡]	\$6.4M	\$5.5M	\$11.9M
Gross Domestic Product	\$8.3M	\$9.1M	\$17.4M

[‡]Labor income includes employee benefits and proprietors income.

Kansas City Region

INDUSTRY INTERLINKAGES: DATA PROCESSING

Data processing employment in the Kansas City region is highly concentrated at over four times the national average. Backward-linked (supply goods and services to the industry) and forward-linked (produce value-added services for consumers) activities display the interrelationship between various industries that add value to data processing. While the backward linkages are between the suppliers of raw materials to the industry, forward linkages are between the industry and the consumers.



Kansas City Region

NOTES

Industry Analysis of a Region's Economic Core

While a business is classified by the primary service or product it creates, another distinction is the market it serves. Companies that target customers outside a region are considered export-based, or core, whereas other businesses mainly serve local customers. Grocery stores, retailers, and doctor's offices are typical examples of local market firms. The distinction between export and local market businesses is important when considering long range economic viability and development.

Export-market industries, by serving customers outside a region, bring new dollars into an economy and form the economic core of the community. Think of manufacturers and large-scale farming. Both industries serve national and global markets and therefore attract new income into the region that is paid out in wages, interests, rents, and profits. By contrast, a local market industry largely churns existing dollars within a region. While local services are absolutely important to a thriving community, seldom can an area's population maintain a robust economy by only selling things to each other; it has to export goods and services to bring in new wealth.

Defining Export-Market Industries

Although some businesses are commonly thought of as exporters, location quotient (LQ) analysis provides a more comprehensive approach. This

quotient indicates how concentrated an industry's employment is in a certain area as compared to the U.S. average. If an industry has an LQ of 2.0 then it is twice as concentrated in employment as the U.S. average.

Location Quotient

$\frac{\text{Regional Employment}_{\text{INDUSTRY}}}{\text{Regional Employment}_{\text{TOTAL}}}$	$\frac{\text{U.S. Employment}_{\text{INDUSTRY}}}{\text{U.S. Employment}_{\text{TOTAL}}}$
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Location quotients can help identify regional industries that may be exporting a substantial amount of goods and services to outside markets. If an industry is much more concentrated than the national average, firms are likely creating more products than the local economy can consume. Industries typically considered as primary exporters include:

Large Agriculture and Forestry Operations

Mining

Manufacturing

Management Headquarters

Tourism*

**High retail/accommodations/restaurant LQ associated with destination spots.*



Kansas City Region

The list of primary exporters should be supplemented with LQ analysis to determine other industries that may be generating a large amount of income from outside a region. Services such as information technology, design and engineering, and research are often examples in metropolitan areas.

Identifying Industry Patterns

The industries with the highest LQ and combined employment were analyzed in the context of the region's economy and knowledge of individual firms to determine if an industry pattern existed. Employment from 2003-2007 was analyzed to coincide with Missouri's growth period during the last business cycle and to control for more recent recessionary effects. However, first quarter 2009 employment and business closures were reviewed to see if a pattern had greatly diminished due to major structural changes after the period of primary analysis.

Spot Strengths were identified as high LQ and employment sectors where 3 or fewer companies employed over 80 percent of the industry's workforce. Spot firm employment or wage information cannot be disclosed due to confidentiality restrictions in the QCEW program. However, this report does try to identify those firm's connections to larger clusters where applicable.

Spot firms employ a large percentage of workers and attract supply chain industries. These businesses are so prominent in a local economy, think of "factory towns," that the firms can overshadow other regional industries. If a Spot business moves out of an area then the industry concentration (LQ) leaves with it, thereby introducing a vulnerability to the region's economy.

Core Cluster patterns takes into account the number of businesses and employment within the region that make up an industry concentration. Cluster businesses are more diversified in firm count. Three or less firms do not account for over 80 percent of industry employment.

Core clusters benefit from the transfer of knowledge and a shared, skilled workforce that close proximity brings. Supply chains develop to serve these companies and competition keeps prices down. Experienced industry entrepreneurs periodically dream up better products, spin-off new local firms, and grow the economic core of a community.

While all companies are influenced by larger economic trends, having a number of similar businesses in an area helps diversify the risk and rewards as each company focuses on specialized products. These core cluster businesses collectively benefit from supporting services and workforce training that is tailored to common industry needs.



Kansas City Region

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1. Quarterly Census of Employment and Wages, 2003-2008 Annual Averages, Bureau of Labor Statistics. The location quotient, cluster summaries and chart are based on 2007 employment and 2003-2007 trends to capture information during the last growth cycle and control for recessionary effects. Location quotient analyzed using the BLS Regional Data Analysis Tool (RDAT).
2. Local Employment Dynamics Program, 2008, U.S. Census Bureau.
3. Kansas City Area Development Council.
4. IMPLAN Economic Impact Model, 2007, MIG Inc.

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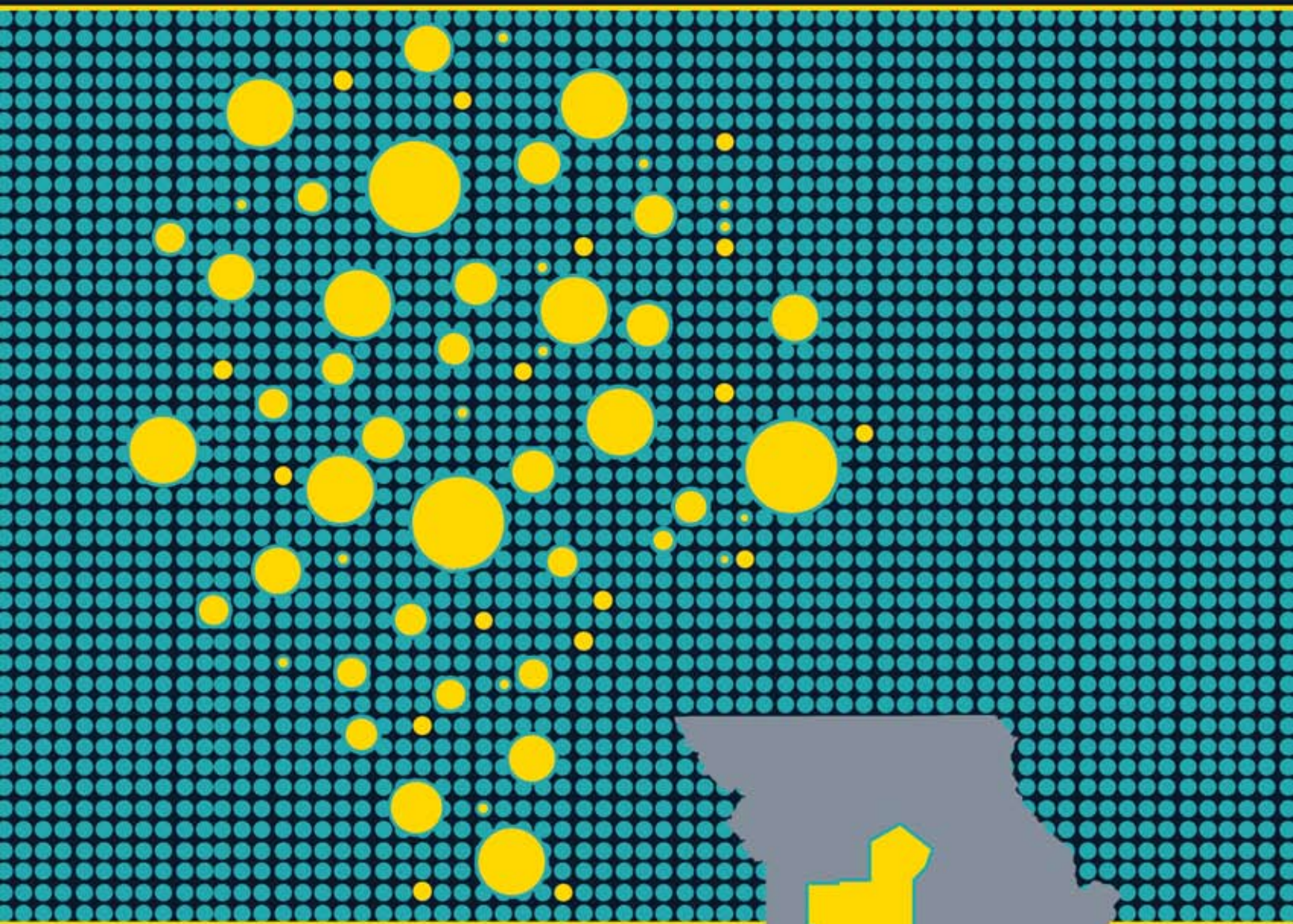
Primary Research: Tom Reichart
Graphic Design: Maggie Lear

Missouri Economic Research and Information Center
Department of Economic Development, Division of Business and Community Services



PATTERN ANALYSIS

HIGHLIGHTING INDUSTRY PATTERNS THAT DRIVE NEW
WEALTH IN A REGIONAL ECONOMY



WEST CENTRAL REGION



AN INTRODUCTION TO INDUSTRY PATTERN ANALYSIS

Discovering patterns of connected industries can be difficult given the number of companies in an economy and the data available for analysis. Yet understanding the business patterns that drive wealth in a region is critical to designing effective development initiatives.

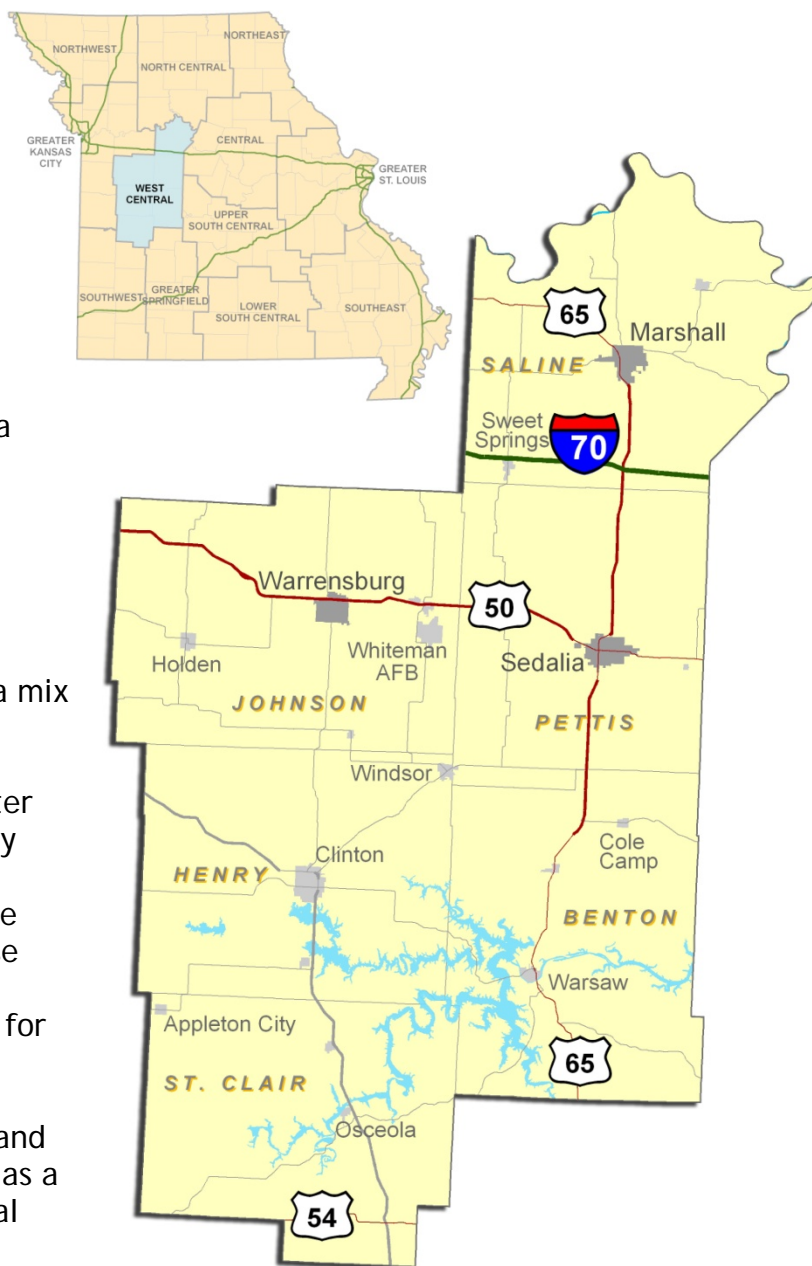
This report uses industry trend, concentration, and individual firm data to summarize two important patterns in a region's economy:

- **Spot Strengths** of large sector employment, typically in one or two firms, and
- **Core Clusters** of employment across a mix of similar or linked industries.

Recognizing spot strengths and core cluster patterns is important as these collectively large employers attract new income to a region. Knowing these industries, and the shared supply-chain and labor issues these companies have, can aid economic and workforce developers in crafting policies for the broadest impact.

Pattern analysis highlights the strengths and linkages of area industries and can serve as a starting point for understanding a regional economy. People familiar with company operations know that no two firms have the same business model. Pattern information should ultimately be enhanced by individuals with local business knowledge.

See the **NOTES** section for more details on industry pattern analysis and the methods used in this report.



What comes after “Pattern Recognition?”

Economic and workforce developers have been speaking the “cluster” language for a long time. However, just knowing that an industry pattern exists is only one step in the process. Here are some additional things to consider:

Group Think

While large, individual businesses will always be important and drive some policy actions, decision-makers can use pattern knowledge to focus efforts on the common problems that related businesses have. This approach makes the best use of limited resources by providing the biggest impact to the most companies.

Customize Help

One size does not fit all when it comes to supporting an industry pattern. Assisting a business cluster may involve specific projects like expanding utilities or broader actions such as helping attract additional knowledge workers. Whatever the needs, the pattern approach can help prioritize actions.

Work on Workforce

Many business location or expansion decisions revolve around issues of available labor. Workforce training geared toward supporting clusters can be very valuable as many of the firms hire workers with similar skill sets. Likewise, talented workers want to locate where clusters of similar businesses offer better odds at finding employment.

Career centers, community colleges, and universities can customize training programs to meet the need of cluster industries for specialized workers.

Spread the Word

Economic and workforce developers can tell the story of how a region’s industries and institutions create clusters of opportunity for existing companies, workers, and new investment. Examples such as the Animal Health Corridor (Missouri-Kansas) and the Plant and Medical Sciences Cluster (St. Louis) are excellent branding campaigns that highlight the combined strengths of businesses, universities, incubators, and workforce to form clusters of growth.

Plan for the Future

The current recession reminds everyone that major structural changes in the economy will occur from time to time. Missouri’s automotive industry is undergoing that change right now. Developers that understand a region’s pattern of industries will be better positioned to promote new opportunities of growth that fit well with an economy’s existing and transforming strengths.

West Central Region

INDUSTRY OVERVIEW

The West Central Region has a population of 165,325, which accounts for 2.8 percent of Missouri's total population. Sedalia is the largest employing city, where nearly 16 percent of area residents work. Other economic centers include Warrensburg (8.8%), Marshall (8.4%), and Clinton (6.9%). Just over 9 percent of region residents work in Jackson County.* The average wage in 2008 was \$28,589.

In 2008 non-farm employment for the area was 56,407, which includes public and private sectors. Manufacturing was the largest employer at 17.3 percent, followed closely by health care. The two combined sectors employ 1 out of every 3 workers. Whiteman Air Force Base is located here and is home to over 3,000 military personnel. Farming is also important as over 7,400 people were estimated to be either a farm owner or worker in 2007.** Many of these farmers may also have other jobs, but clearly agriculture is significant to the region.

West Central Region Industry Employment 2008				
NAICS	Industry	Annual Avg. Emp.	Perc. Total Emp.	Annual Avg. Wage
11	Agriculture, Forestry, Fishing, and Hunting	404	0.7%	\$31,002
21	Mining	79	0.1%	\$36,606
22	Utilities	523	0.9%	\$60,299
23	Construction	2,558	4.5%	\$35,606
31-33	Manufacturing	9,751	17.3%	\$36,439
42	Wholesale Trade	1,702	3.0%	\$33,067
44-45	Retail Trade	7,068	12.5%	\$20,285
48-49	Transportation and Warehousing	1,459	2.6%	\$34,911
51	Information	1,077	1.9%	\$28,357
52	Finance and Insurance	1,508	2.7%	\$34,771
53	Real Estate and Rental and Leasing	508	0.9%	\$22,770
54	Professional, Scientific, and Technical Services	1,067	1.9%	\$35,217
55	Management of Companies and Enterprises	310	0.5%	\$37,375
56	Administrative and Support Services	1,837	3.3%	\$20,156
61	Educational Services	6,996	12.4%	\$30,908
62	Health Care and Social Assistance	9,224	16.4%	\$29,551
71	Arts, Entertainment, and Recreation	713	1.3%	\$12,907
72	Accommodation and Food Services	4,921	8.7%	\$10,284
81	Other Services	1,636	2.9%	\$18,911
92	Public Administration	3,069	5.4%	\$35,337
TOTAL		56,407		\$28,589

* Local Employment Dynamics, U.S. Census Bureau, 2008.

**The most accurate and timely industry employment numbers come from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages program (QCEW). However, reporting requirements for this program excludes most farmers so the USDA 2007 Census of Agriculture is used as an alternative, non-comparative measure.

West Central Region

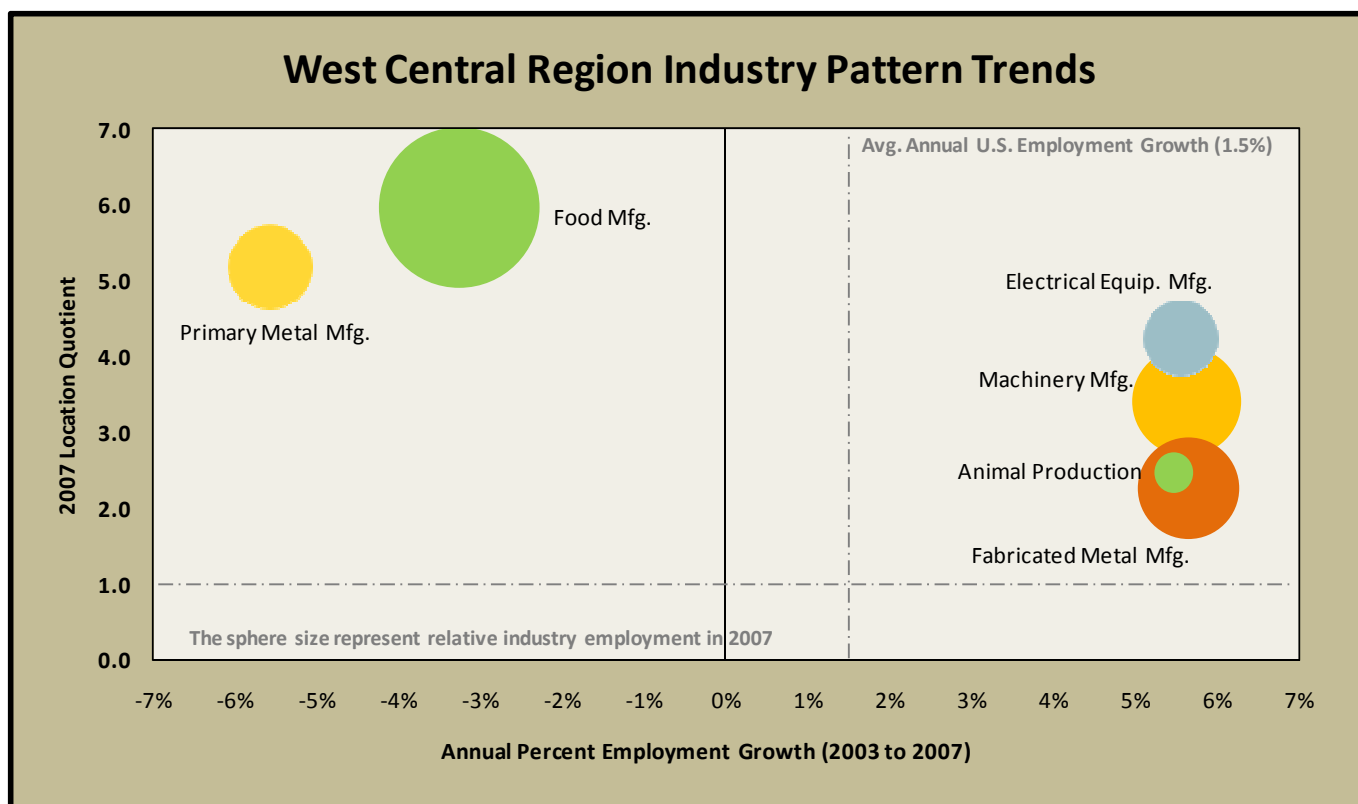
INDUSTRY PATTERNS

West Central Missouri industry analysis revealed a number of core clusters and spot strengths that can be described in three overall patterns. Agribusiness, Metal/Machinery Manufacturing, and Electrical Equipment Manufacturing represent strong industry concentrations in the region and encompass firms in a variety of industry subsectors.

Industry Pattern Type and Location Quotient (LQ)

TYPE	NAICS	INDUSTRY	LQ
Cluster	112	Animal Production	2.5
Spot	311	Food Manufacturing	6.0
Spot	331	Primary Metal Manufacturing	5.2
Cluster	332	Fabricated Metal Product Manufacturing	2.3
Cluster	333	Machinery Manufacturing	3.4
Spot	335	Electrical Equipment and Appliance Mfg.	4.3

These core cluster and spot industries account for 18 percent of all private employment in the region.* Patterns demonstrate the heavy importance of agribusiness and manufacturing sectors, a common characteristic of many rural Midwestern regions. The specialized products developed by area firms closely link with other regions and industry strengths in Missouri.



* Spot industry employment by detailed sector is not reportable due to BLS confidentiality restrictions.

Agribusiness Cluster

Animal Production (NAICS 112)

Food Manufacturing (NAICS 311) - Spot Strength

The Agribusiness cluster, comprised primarily of food manufacturing along with farm producers, represents a significant industry for the West Central Region.* Farmers and food manufacturers both benefit from the close proximity which reduces transportation costs. Likewise, many local firms in other sectors exist to serve these producers.

Food manufacturers are six times more concentrated in this region than the national average. Although employment declined over the 2003-2007 primary study period, job numbers did increase slightly through the recession. Manufacturers in this area specialize in meat and dairy products.

Missouri is located in the largest corn and soybean producing region of the world, so it is no surprise that food manufacturing is a specialty of the state (LQ 1.4). A positive trend of emerging world economies demanding more value-added food products has boosted exports for the U.S. in recent years. As foreign countries emerge from the global recession, Missouri and other Midwestern states will benefit as demand picks up.

Metal and Machinery Manufacturing Cluster

Primary Metal Manufacturing (NAICS 331) - Spot Strength

Fabricated Metal Product Manufacturing (NAICS 332)

Machinery Manufacturing (NAICS 333)

Metal and Machinery Manufacturing includes firms in primary and fabricated metal production along with machinery manufacturers that are likely connected in this region. Cluster employment in 2007 was over 3,700 with fabricated metal and machinery manufacturing growing at an annual rate of over 5.6 percent from 2003 to 2007.

Fabricated metal producers shape basic metal forms provided by primary metal manufacturers. Machinery makers use primary and fabricated metal products as key inputs in the production process. Companies in this cluster also hire similarly skilled workers, such as welders, machinists, and multiple machine tool operators, and pay industry wages about 30 percent higher than the regional average.

* Crop and animal production employment used in the summary and location quotient are from the Quarterly Census of Employment and Wages (QCEW) and does not capture most farm production employment. The U.S. 2007 Census of Agriculture indicated that a combined total of 7,477 farm owners and hired labor worked in the West Central Region but due to different collection methodologies cannot be directly added to the QCEW. However, the Agriculture Census employment numbers do highlight the greater significance of farm production to the region's economy.

West Central Region

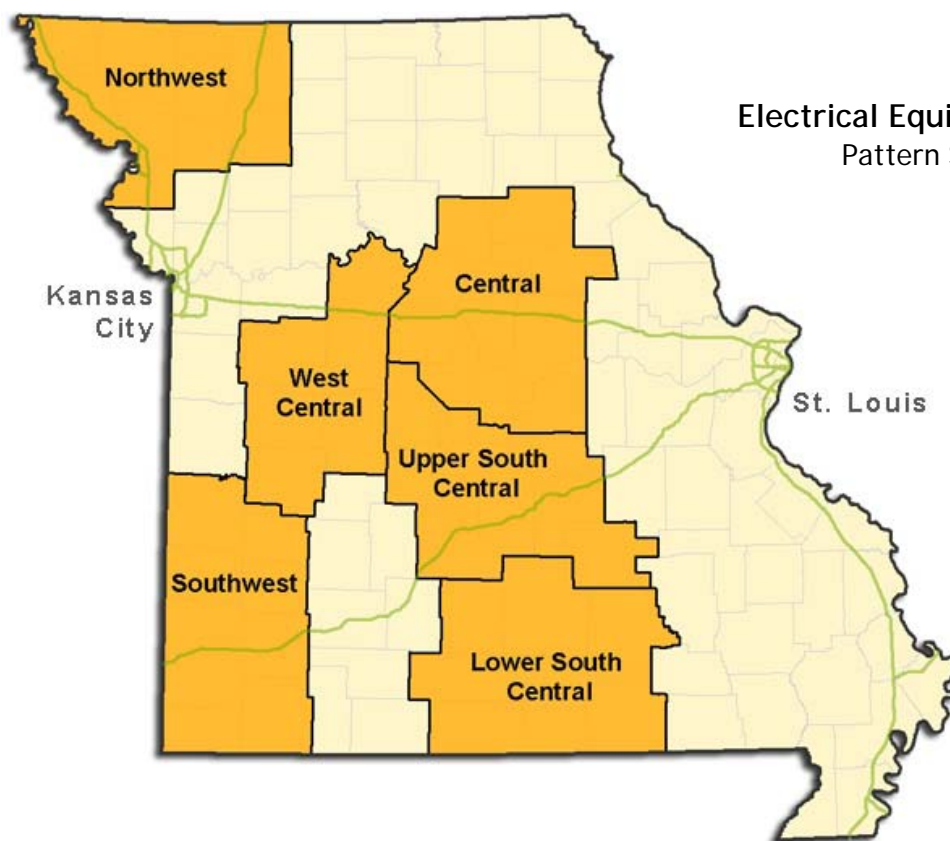
The recession diminished the number of jobs in the Metal and Machinery Mfg. Cluster but employment and location quotients were still significant in 2009. Companies in this regional cluster specialize in aluminum casting, metal wire and ropes, ammunition, agribusiness machinery, and HVAC machinery.

Electrical Equipment Manufacturing Spot Strength

Electrical Equipment and Appliance Manufacturing (NAICS 335)

Electrical equipment manufacturing is the smallest pattern industry in the area and represents a spot strength with a few firms dominating employment. The industry did show impressive annual growth of over 5.5 percent from 2003 to 2007. U.S. growth averaged 1.5 percent over the same time period.

Firms in the region specialize in small electric motors and electric utility components. These market niches are shared with other regions of the state which together form larger multi-regional clusters in electrical equipment and energy products. Recently a large energy consulting firm located in the area sending a good signal that Missouri's strength in this larger goods-producing cluster is paying off with the attraction of related professional services.



Electrical Equipment Manufacturing
Pattern Strength Regions

West Central Region

INDUSTRY CONTRIBUTION IMPACT: FABRICATED METAL PRODUCT MANUFACTURING

Pattern recognition is important since changes to business production can have broad regional impacts across a range of linked industries and institutions. Fabricated metal product manufacturing is analyzed in this example of how those connections positively influence the area's economy.

Fabricated metal manufacturing uses basic inputs from iron ore, steel mills, ferroalloy manufacturing, metal cutting, and machine tool manufacturing. The industry makes fabricated structural products that are typically inputs to other final products sold in export markets, thereby bringing additional money into the regional economy.

Fabricated metal product manufacturing workers are among the highest paid in the region at \$34,476. An addition of 100 employees in primary metal manufacturing creates an estimated total of 175 jobs paying \$6.3 million in salaries and contributing over \$10 million to the gross state product. The value-added per worker in fabricated metal product manufacturing and supporting industries is \$57,143.



Fabricated Metal Manufacturing Impact: Addition of 100 employees

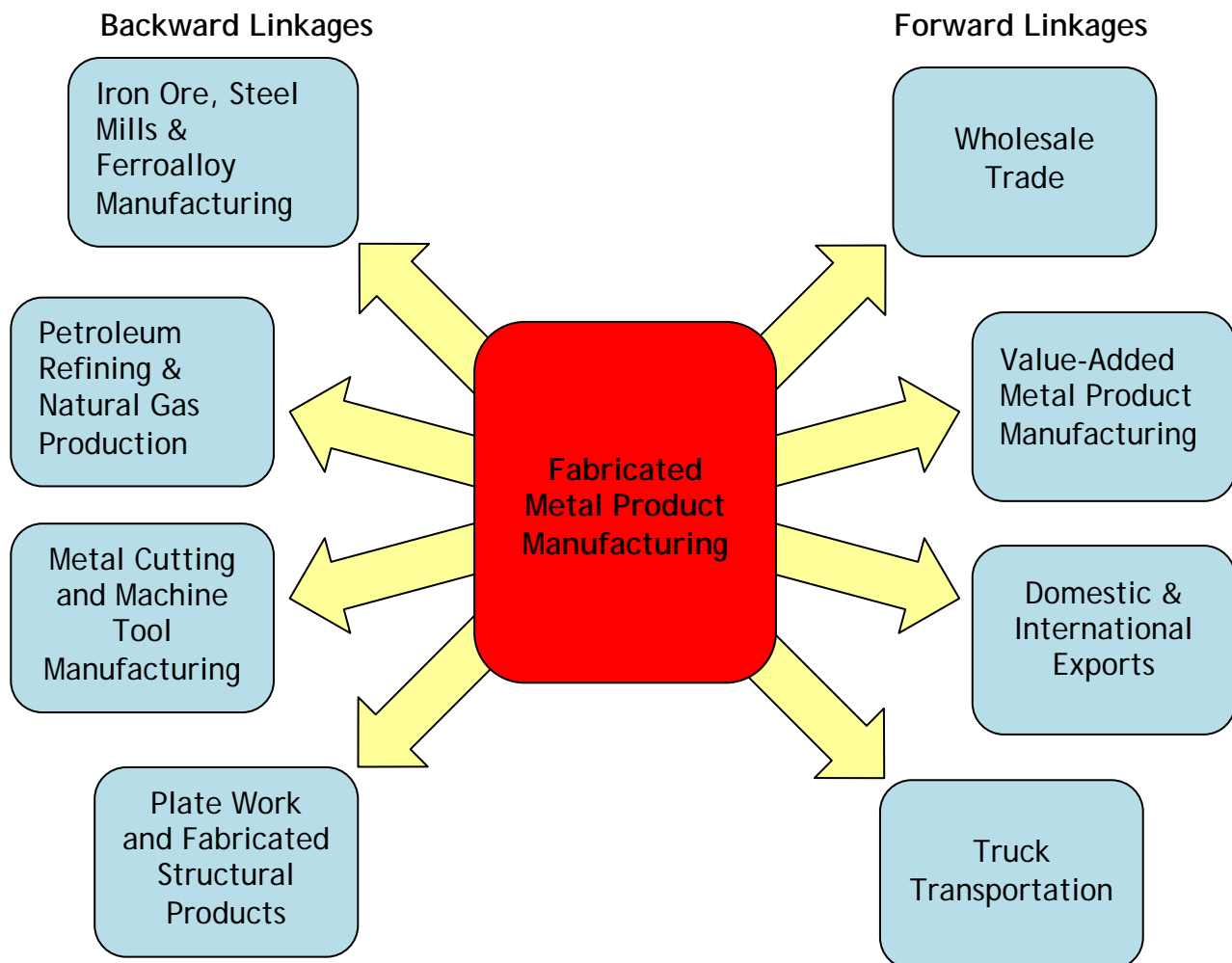
	Direct Impact	Indirect Impact	Total Impact
Employment	100	75	175
Labor Income*	\$4.0M	\$2.3M	\$6.3M
Gross Domestic Product	\$6.3M	\$3.7M	\$10.0M

*Labor income includes employee benefits and proprietors income.

West Central Region

INDUSTRY INTERLINKAGES: FABRICATED METAL PRODUCT MANUFACTURING

Fabricated metal product manufacturing in the West Central Region employs a large number of local workers. Backward-linked (supply goods and raw materials to the industry) and forward-linked (produce value-added goods for consumers) activities display the interrelationship between various industries that add value to fabricated metal product manufacturing. While the backward linkages are between the suppliers of raw materials to the industry, forward linkages are between the industry and the consumers.



NOTES

Industry Analysis of a Region's Economic Core

While a business is classified by the primary service or product it creates, another distinction is the market it serves. Companies that target customers outside a region are considered export-based, or core, whereas other businesses mainly serve local customers. Grocery stores, retailers, and doctor's offices are typical examples of local market firms. The distinction between export and local market businesses is important when considering long range economic viability and development.

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Defining Export-Market Industries

Although some businesses are commonly thought of as exporters, location quotient (LQ) analysis provides a more comprehensive approach. This quotient indicates how concentrated an industry's employment is in a certain area as compared to the U.S. average. If an industry has an LQ of 2.0 then it is twice as concentrated in employment as the U.S. average.

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Manufacturing

Management Headquarters

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**High retail/accommodations/restaurant LQ associated with destination spots.*



West Central Region

The list of primary exporters should be supplemented with LQ analysis to determine other industries that may be generating a large amount of income from outside a region. Services such as information technology, design and engineering, and research are often examples in metropolitan areas.

Identifying Industry Patterns

The industries with the highest LQ and combined employment were analyzed in the context of the region's economy and knowledge of individual firms to determine if an industry pattern existed. Employment from 2003-2007 was analyzed to coincide with Missouri's growth period during the last business cycle and to control for more recent recessionary effects. However, third quarter 2009 employment and business closures were reviewed to see if a pattern had greatly diminished due to major structural changes after the period of primary analysis.

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West Central Region

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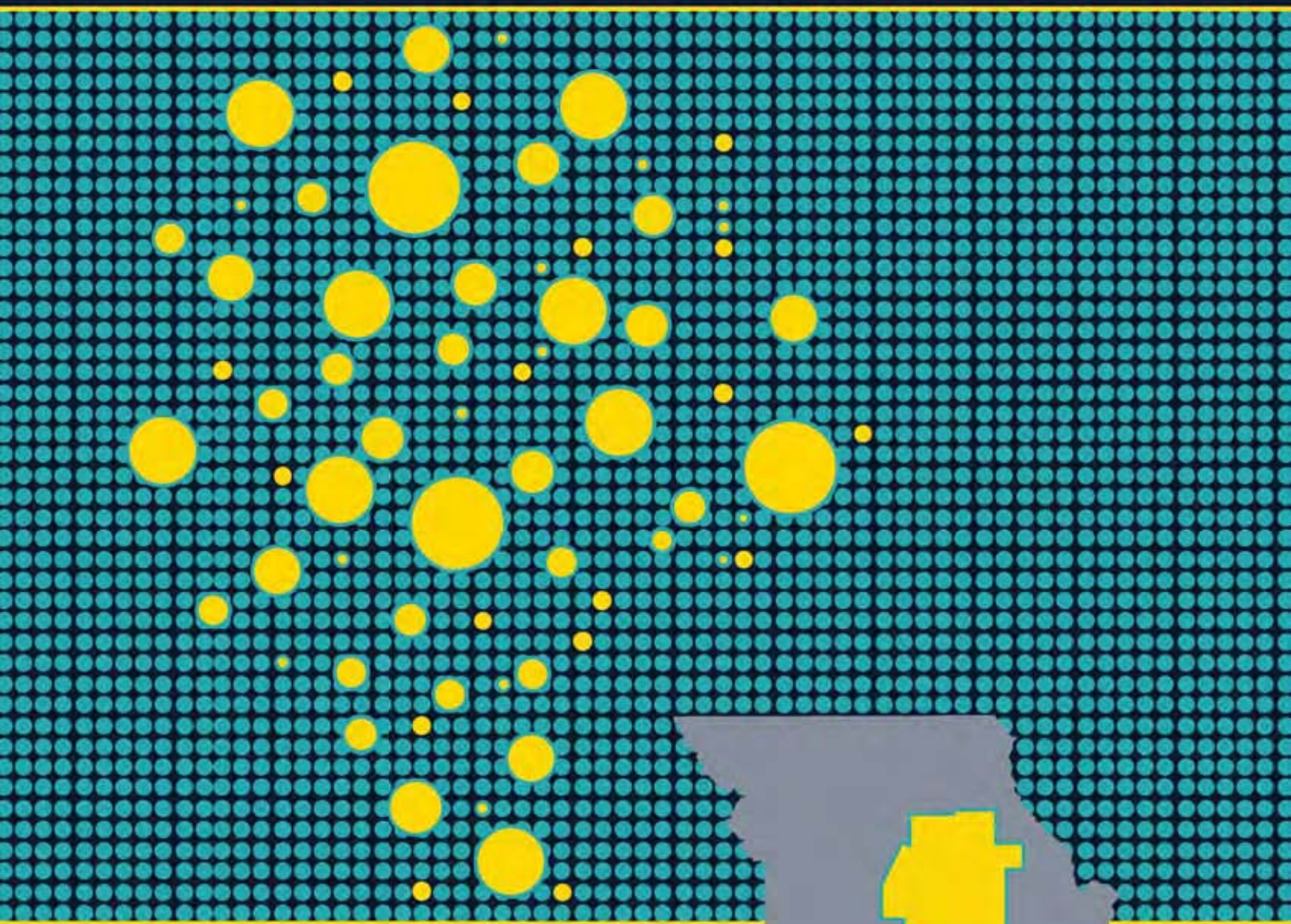
Primary Research: Alan Spell
Graphic Design: Maggie Lear

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PATTERN ANALYSIS

HIGHLIGHTING INDUSTRY PATTERNS THAT DRIVE NEW
WEALTH IN A REGIONAL ECONOMY



CENTRAL REGION



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Central Region

AN INTRODUCTION TO INDUSTRY PATTERN ANALYSIS

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Central Region

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One size does not fit all when it comes to supporting an industry pattern. Assisting a business cluster may involve specific projects like expanding utilities or broader actions such as helping attract skilled workers. Whatever the needs, the pattern approach can help prioritize actions.

Work on Workforce

Many business location or expansion decisions revolve around issues of available labor. Workforce training geared toward supporting clusters can be very valuable as many of the firms hire workers with similar skill sets. Likewise, talented workers want to locate where clusters of similar businesses offer better odds at finding employment.

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Central Region

INDUSTRY OVERVIEW

The Central region has a population of 389,080, or about 6.5 percent of Missouri's total population. The two largest economic centers include Columbia, where roughly 32 percent of area residents work, and Jefferson City (21%).* The average wage in 2008 was \$33,262, lower than the state average of \$40,710.

In 2008 non-farm employment for the area was just over 188,000, which includes public and private sectors. Healthcare and educational services (both public and private), combine with public administration to employ 4 out of every 10 workers. Retail is also a large industry since Columbia and Jefferson City serve as regional shopping destinations. Large sub-sectors include the numerous universities and colleges that employ over 12,000 workers and state government, which due to Missouri's Jefferson City capital supports over 21,000 jobs.

Central Region Industry Employment 2008				
NAICS	Industry	Annual Avg. Emp.	Perc. Total Emp.	Annual Avg. Wage
11	Agriculture, Forestry, Fishing, and Hunting	455	0.2%	\$25,770
21	Mining	248	0.1%	\$43,571
22	Utilities	2,448	1.3%	\$72,825
23	Construction	9,410	5.0%	\$38,817
31-33	Manufacturing	15,537	8.3%	\$37,932
42	Wholesale Trade	5,563	3.0%	\$36,331
44-45	Retail Trade	22,525	12.0%	\$21,346
48-49	Transportation and Warehousing	5,597	3.0%	\$33,707
51	Information	3,432	1.8%	\$39,323
52	Finance and Insurance	6,993	3.7%	\$45,879
53	Real Estate and Rental and Leasing	1,934	1.0%	\$25,420
54	Professional, Scientific, and Technical Services	5,051	2.7%	\$43,402
55	Management of Companies and Enterprises	3,938	2.1%	\$50,322
56	Administrative and Support Services	5,859	3.1%	\$22,055
61	Educational Services	22,405	11.9%	\$39,616
62	Health Care and Social Assistance	29,162	15.5%	\$35,592
71	Arts, Entertainment, and Recreation	2,970	1.6%	\$16,425
72	Accommodation and Food Services	14,889	7.9%	\$11,996
81	Other Services	5,476	2.9%	\$25,698
92	Public Administration	25,885	13.8%	\$36,324
TOTAL		188,063		\$33,262

* Local Employment Dynamics, U.S. Census Bureau, 2008.

Central Region

INDUSTRY PATTERNS

Industry pattern analysis revealed some interesting core clusters and a spot strength in central Missouri. The production of printed publications, machinery, and electrical equipment comprise three manufacturing patterns in mid-Missouri. Warehousing and logistics, along with insurance services, round out the five business patterns.

Industry Pattern Type and Location Quotient (LQ)

TYPE	NAICS	INDUSTRY	LQ
Cluster	323	Print Manufacturing	1.7
Cluster	333	Machinery Manufacturing	1.4
Spot	335	Electrical Equip. Mfg.	4.2
Cluster	493	Warehousing & Logistics	3.8
Cluster	524	Insurance	1.7

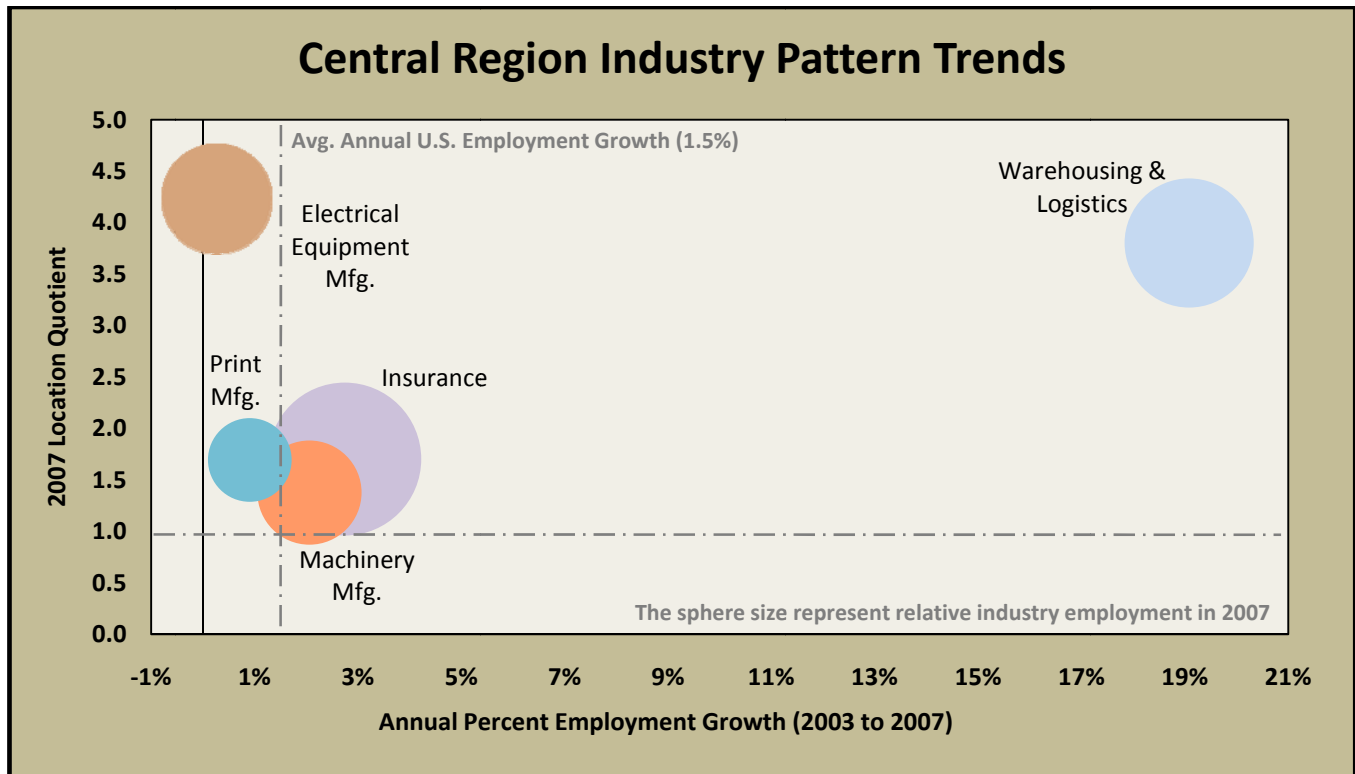
These core cluster and spot industries account for over 9 percent of all regional private employment.* The numerous universities and colleges in central Missouri also play a key role in attracting new income to the area, a trait that all pattern industries share. Although standard industry measures are less suited to gauging higher education contributions, the positive influence of these institutions should be a part of any development plan.

Pattern Summary

Pattern	Print Mfg.	Machinery Mfg.	Electrical Equip. Mfg.	Warehousing & Logistics	Insurance
Industry	Printing and Related Support Activities	Machinery Manufacturing	Electrical Equipment and Appliance Manufacturing (Spot Strength)	Warehousing, Storage, and Related Logistics	Insurance Carriers and Related Activities
Location Quotient	1.69	1.38	4.23	3.8	1.70
Employment	1,196	1,850	ND	2,846	4,173
Avg. Wage	\$38,873	\$33,513	ND	\$28,988	\$46,167
Description	Print products, such as books and periodicals, and perform support activities, such as bookbinding, platemaking services, and data imaging. The support activities are an integral part of the printing industry.	Create end products that apply multiple mechanical forces such as forging, stamping, bending, forming, and machining processes. Welding and assembling are often used to join separate parts together.	Manufacture products that generate, distribute and use electrical power to include lighting, appliances, power distribution components, transformers, etc.	Engaged in operating warehousing and storage facilities for general merchandise and other products. Firms take responsibility for storing and securing goods and may also provide a range of logistics services related to the distribution of goods.	Primarily engaged in the underwriting of annuities and insurance policies or the facilitation of underwriting by selling insurance and other employee-benefit related services.

* Spot industry employment and wages are non-disclosable (ND) due to state and federal confidentiality requirements.

Central Region



Print Manufacturing

Print Manufacturing and Related Support Activities (NAICS 323)

Print manufacturing is concentrated in central Missouri and pays above average wages. From 2003 to 2007 employment grew at just under 1 percent a year, while nationally the industry declined by 1.9 percent on an annual basis. Print manufacturing is increasingly competing with digital media for market share, which is helping drive down industry employment. Companies in this traditional sector may need to diversify with online content to stay competitive.

While print manufacturing is the smallest pattern employer in the region, it has historically been a strong central Missouri industry. The influence of this cluster can be seen in the area's warehousing and logistics sector which has firms that specialize in book/periodical storage. This industry is linked to North Central Missouri which has a print manufacturing and publishing cluster as well as the University of Missouri's journalism department, the first school of journalism in the world.



Central Region

Although this broader industry faces challenges as printed materials are replaced by online content, local firms may benefit from the innovative digital media research currently being developed at the University of Missouri (see **Seeding the Knowledge Industry**).

Machinery Manufacturing

Machinery Manufacturing (NAICS 333)

Machinery manufacturing employment in this region grew by nearly 2 percent a year from 2003 to 2007, just above the U.S. annual growth of 1.5 percent. The industry's concentration, measured by a location quotient of 1.4, also increased over the same period.

This manufacturing cluster is primarily engaged in the export of industrial inputs, serving intermediate demands particularly in commercial heating and cooling equipment. The sector declined slightly in employment during 2008 which is not surprising given the global reduction in manufacturing output. Most firms do not appear to be linked to the automotive sector which is seeing more drastic, long-term changes. This fact may help the sector rebound more quickly once the economy turns around.

Electrical Equipment Manufacturing

Electrical Equipment and Appliance Manufacturing (NAICS 335)

Electrical equipment manufacturing in Mid-Missouri has the highest location quotient of any pattern industry. Although a small number of firms operate in the area, these companies employ a large workforce and pay well above average wages. The recession has hit the industry in central Missouri but overall employment and industry concentrations are still very significant.

The firms in this region are global companies that provide a range of industrial electrical equipment. Prior to the recession this industry benefited from a rising demand in developing countries for basic utilities as well as the need to replace aging infrastructure in the U.S. These firms will hopefully benefit from rebounding demand once the pace of economic growth picks up in the U.S. and in developing countries.

Warehousing and Logistics

Warehousing and Storage (NAICS 493) and a subgroup of firms in Company Management (NAICS 551)

Warehousing, storage, and related logistics companies in central Missouri have a location quotient of 3.8, the second highest industry pattern in the region. These companies grew at an annual rate of over 19 percent from 2003 to 2007, much higher than the national average of 1.5 percent. Even through the recession industry employment held fairly steady.



Central Region

The east-west interstate 70 and central state location make this region a desirable location for warehousing and logistics operations. Many area firms specialize in consumer goods but a few deal primarily with print material. Print manufacturing is an historic strength in Central and North Central Missouri.

Mid-Missouri's central location in the state and U.S., coupled with the lower land and labor cost of a smaller metropolitan area, may continue to be an attraction to warehousing and logistics operations.

Insurance

Insurance Carriers and Related Activities (NAICS 524) and a subgroup of firms in Company Management (NAICS 551)

The insurance industry is not typically thought of as a large exporter of services. In most cases small operators serve a regional market and services outside that area are the exception. While central Missouri has a large number of local agents, it is also home to many insurance headquarter operations.

Location quotient analysis indicates a growing concentration of insurance employment (1.7 LQ) in Mid-Missouri. The industry grew at a 2.7 percent annual rate during the last business cycle, more than double the overall U.S. growth rate.

Headquarter operations manage insurance sales over large regions of the U.S. and therefore bring in new income to the local economy. But apart from the broader market these firms serve, the real significance is the specialized knowledge this concentration brings to Mid-Missouri.

Insurance headquarters, like banks, typically employ the bulk of senior leadership, information technology personnel, and risk-management specialists within these operations. These higher-skilled employees are paid well and can be selective about work locations. The fact that Mid-Missouri continually attracts these type of firms speaks well of the local quality of life.

Central Region

SEEDING THE KNOWLEDGE INDUSTRY

Universities and colleges can have a powerfully positive influence on a regional economy, and that is certainly the case in central Missouri.



Aside from the gains of a highly educated workforce, these institutions have research concentrations that are similar to the notion of pattern industries. These strengths can be the intellectual seed for new industry developments that are critical for long-term economic growth.

The University of Missouri in Columbia has many research strengths, some linked to Missouri's historic role as a major food-belt state, and others that break new technology ground. Examples include:

Animal and Plant Science

The university's research strength in animal science, linked to the Kansas/Missouri Animal Health Corridor, and plant science, linked to large St. Louis companies and institutions, serves as a major engine of agribusiness knowledge. This historic research and business strength will continue to bring new wealth to Missouri, especially as the demand for value-added foods rise with incomes in developing countries.

Medical Science

Advanced medical research to address human and animal health is present at the Schools of Medicine and Veterinary Medicine. These strengths are also link to medical science activities in St. Louis and Kansas City. Medical science knowledge continues to increase in value as health care issues remain a long-standing national concern.

Sustainable Energy Science

Research into nuclear and biofuel energy sources is well underway at the University. Assets such as a nuclear reactor, the Nuclear Science and Engineering Institute, and a history of research in crop and plant sciences, gives the University an advantage in these fields of study.

Nanotechnology

Nanotechnology, the ability to manipulate matter at extremely small scales, is becoming increasingly important in material, medical, sensor, and energy technology. The university has strengths in engineering and medical nanotechnology research, which along with private research companies, has recently helped the area attract federal funding to study commercial and military applications.

New Media

The school's traditional strength in journalism, combined with a new institute focused on digital media, has paved the way for interdisciplinary research into better communication technologies across all colleges. These efforts helped to bring a new media start-up to Columbia in 2008 and can lead to innovations that benefit other related industries in the local economy.

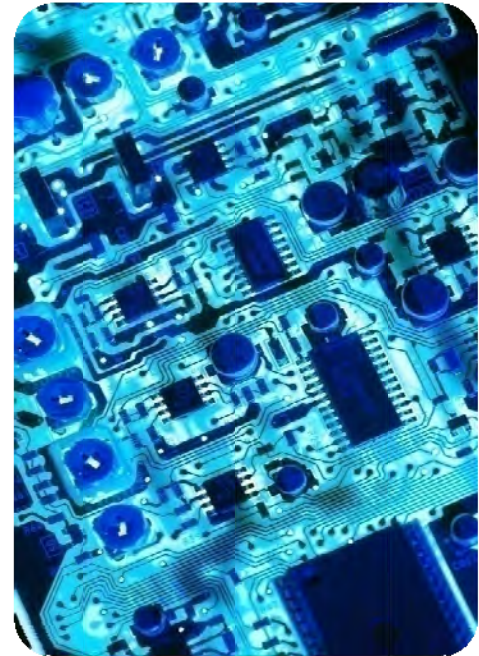
Central Region

INDUSTRY CONTRIBUTION IMPACT: ELECTRICAL EQUIPMENT MANUFACTURING

Pattern recognition is important as changes to regional business production can have broad impacts across a range of linked industries and institutions. Electrical equipment manufacturing is analyzed to demonstrate how those connections positively influence the area's economy.

Electrical equipment manufacturing makes basic electrical equipment that is typically an input to other final products sold in export markets, thereby bringing additional money into the regional economy. The industry is linked to the manufacture of relay, switchgear and industrial controls, metal smelting and refining, printed circuit assembly, screws, bolts and turned products, and package materials.

An addition of 100 employees in electrical equipment manufacturing creates an estimated total of 193 regional jobs paying \$8.3 million in salaries and contributing over \$13.1 million to the gross state product. The value-added per worker in electrical equipment and supporting industries is \$67,876.



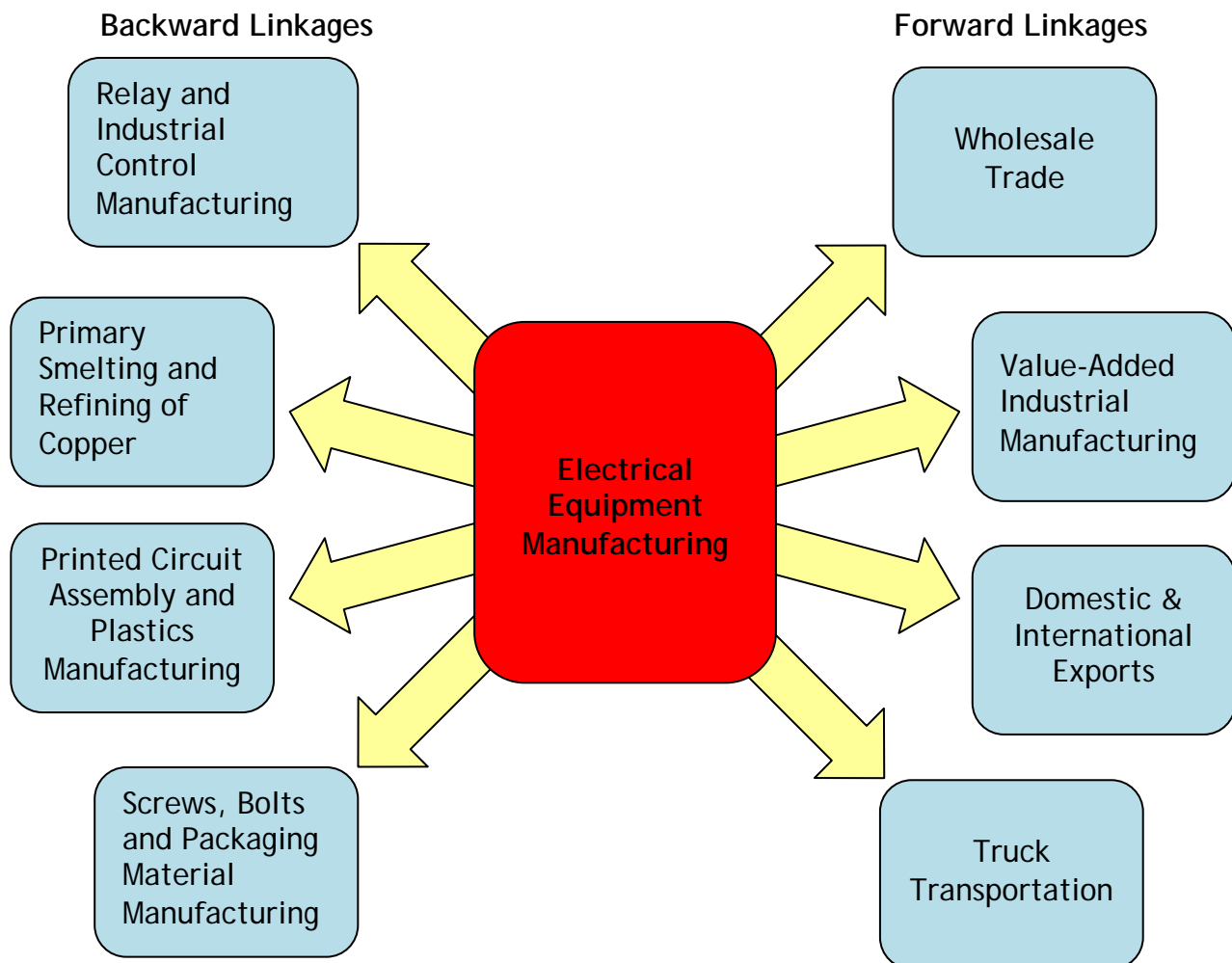
Electrical Equipment Manufacturing Impact: Addition of 100 employees			
	Direct Impact	Indirect Impact	Total Impact
Employment	100	93	193
Labor Income*	\$4.7M	\$3.6M	\$8.3M
Gross Domestic Product	\$7.3M	\$5.8M	\$13.1M

*Labor income includes employee benefits and proprietors income.

Central Region

INDUSTRY INTERLINKAGES: ELECTRICAL EQUIPMENT MANUFACTURING

Electrical equipment manufacturing in the Central region employs a large number of skilled workers. Backward-linked (supply goods and raw materials to the industry) and forward-linked (produce value-added goods for consumers) activities display the interrelationship between various industries that add value to electrical equipment manufacturing. While the backward linkages are between the suppliers of raw materials to the industry, forward linkages are between the industry and the consumers.



Central Region

NOTES

Industry Analysis of a Region's Economic Core

While a business is classified by the primary service or product it creates, another distinction is the market it serves. Companies that target customers outside a region are considered export-based, or core, whereas other businesses mainly serve local customers. Grocery stores, retailers, and doctor's offices are typical examples of local market firms. The distinction between export and local market businesses is important when considering long range economic viability and development.

Export-market industries, by serving customers outside a region, bring new dollars into an economy and form the economic core of the community. Think of manufacturers and large-scale farming. Both industries serve national and global markets and therefore attract new income into the region that is paid out in wages, interests, rents, and profits. By contrast, a local market industry largely churns existing dollars within a region. While local services are absolutely important to a thriving community, seldom can an area's population maintain a robust economy by only selling things to each other; it has to export goods and services to bring in new wealth.

Defining Export-Market Industries

Although some businesses are commonly thought of as exporters, location quotient (LQ) analysis provides a more comprehensive approach. This quotient indicates how concentrated an industry's employment is in a certain area as compared to the U.S. average. If an industry has an LQ of 2.0 then it is twice as concentrated in employment as the U.S. average.

Location Quotient

$\frac{\text{Regional Employment}_{\text{INDUSTRY}}}{\text{Regional Employment}_{\text{TOTAL}}}$	$\frac{\text{U.S. Employment}_{\text{INDUSTRY}}}{\text{U.S. Employment}_{\text{TOTAL}}}$
--	--

Location quotients can help identify regional industries that may be exporting a substantial amount of goods and services to outside markets. If an industry is much more concentrated than the national average, firms are likely creating more products than the local economy can consume. Industries typically considered as primary exporters include:

Large Agriculture and Forestry Operations

Mining

Manufacturing

Management Headquarters

Tourism*

**High retail/restaurant LQ associated with destination spots.*



Central Region

The list of primary exporters should be supplemented with LQ analysis to determine other industries that may be generating a large amount of income from outside a region. Services such as information technology, design and engineering, and research are often examples in metropolitan areas.

Identifying Industry Patterns

The industries with the highest LQ and combined employment were analyzed in the context of the region's economy and knowledge of individual firms to determine if an industry pattern existed. Employment from 2003-2007 was analyzed to coincide with Missouri's growth period during the last business cycle and to control for more recent recessionary effects. However, first quarter 2009 employment and business closures were reviewed to see if a pattern had greatly diminished due to major structural changes after the period of primary analysis.

Spot Strengths were identified as high LQ and employment sectors where 3 or fewer companies employed over 80 percent of the industry's workforce. Spot firm employment or wage information cannot be disclosed due to confidentiality restrictions in the QCEW program. However, this report does try to identify those firm's connections to larger clusters where applicable.

Spot firms employ a large percentage of workers and attract supply chain industries. These businesses are so prominent in a local economy, think of "factory towns," that the firms can overshadow other regional industries. If a Spot business moves out of an area then the industry concentration (LQ) leaves with it, thereby introducing a vulnerability to the region's economy.

Core Cluster patterns takes into account the number of businesses and employment within the region that make up an industry concentration. Cluster businesses are more diversified in firm count. Three or less firms do not account for over 80 percent of industry employment.

Core clusters benefit from the transfer of knowledge and a shared, skilled workforce that close proximity brings. Supply chains develop to serve these companies and competition keeps prices down. Experienced industry entrepreneurs periodically dream up better products, spin-off new local firms, and grow the economic core of a community.

While all companies are influenced by larger economic trends, having a number of similar businesses in an area helps diversify the risk and rewards as each company focuses on specialized products. These core cluster businesses collectively benefit from supporting services and workforce training that is tailored to common industry needs.



Central Region

SOURCES

1. Quarterly Census of Employment and Wages, 2003-2008 Annual Averages, Bureau of Labor Statistics. The location quotient, cluster summaries and chart are based on 2007 employment and 2003-2007 trends to capture information during the last growth cycle and control for recessionary effects. Location quotient analyzed using the BLS Regional Data Analysis Tool (RDAT).
2. Local Employment Dynamics Program, 2008, U.S. Census Bureau.
3. IMPLAN Economic Impact Model, 2007, MIG Inc.

Winter 2010

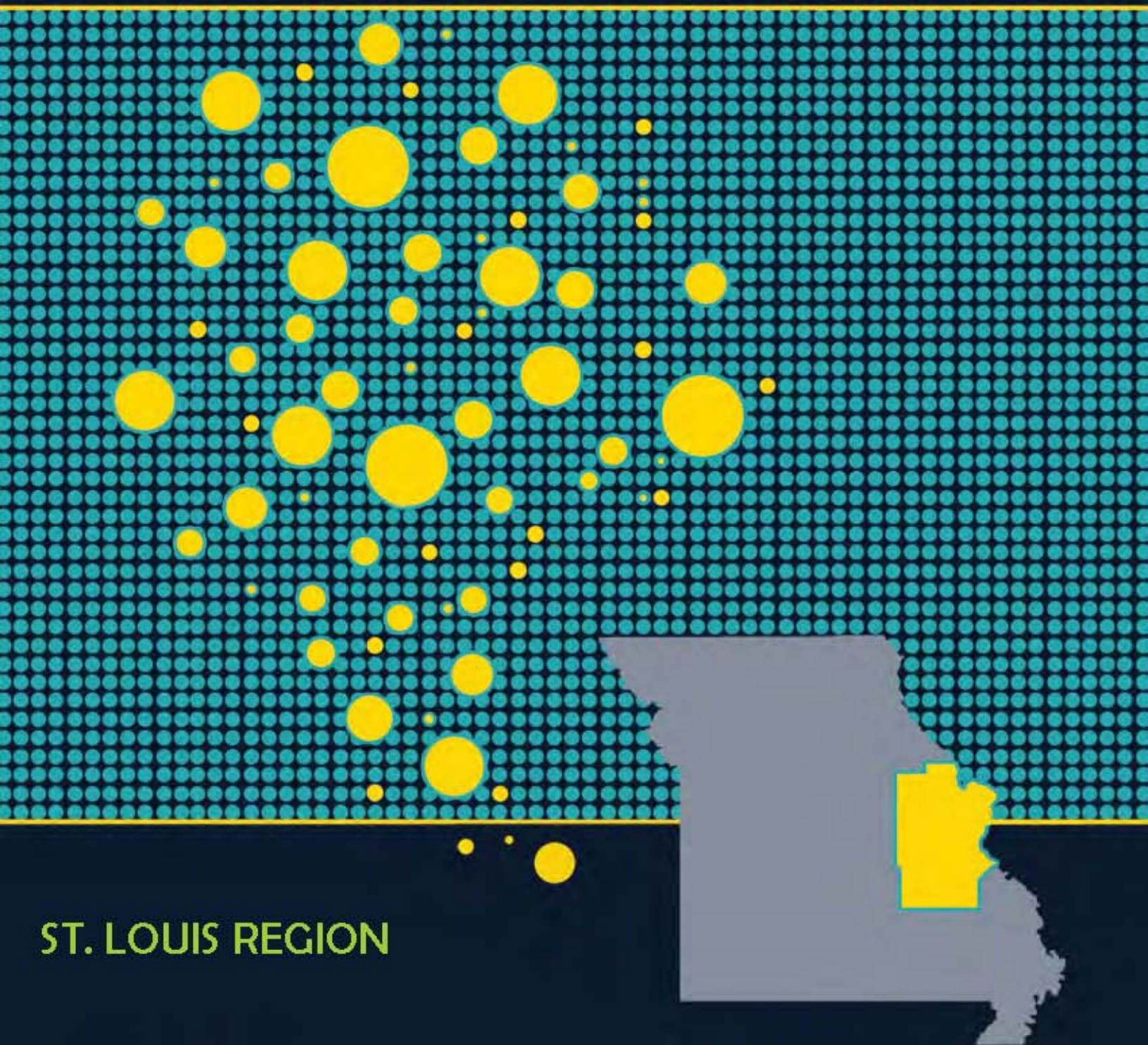
Primary Research: Scott Glosemeyer
Graphic Design: Maggie Lear
Editing: Sreedhar Upendram and Alan Spell

Missouri Economic Research and Information Center
Department of Economic Development, Division of Business and Community Services



PATTERN ANALYSIS

HIGHLIGHTING INDUSTRY PATTERNS THAT DRIVE NEW
WEALTH IN A REGIONAL ECONOMY



ST. LOUIS REGION

St. Louis Region

AN INTRODUCTION TO INDUSTRY PATTERN ANALYSIS

Discovering patterns of connected industries can be difficult given the number of companies in an economy and the data available for analysis. Yet understanding the business patterns that drive wealth in a region is critical to designing effective development initiatives.

This report uses industry trend, concentration, and individual firm data to summarize two important patterns in a region's economic core:

- **Spot Strengths** of large sector employment, typically in one or two firms, and
- **Core Clusters** of employment across a mix of similar or linked industries.

Recognizing spot strengths and core cluster patterns is important as these collectively large employers attract new income to a region. Knowing these industries, and the shared supply-chain and labor issues these companies have, can aid economic and workforce developers in the crafting of policies for the broadest impact.

Pattern analysis highlights the strengths and linkages of area industries and can serve as a starting point for understanding a regional economy. People familiar with company operations know that no two firms have the same business model. Pattern information should ultimately be enhanced by individuals with local business knowledge.

See the **NOTES** section for more details on industry pattern analysis and the methods used in this report.





St. Louis Region

What comes after “Pattern Recognition?”

Economic and workforce developers have been speaking the “cluster” language for a long time. However, just knowing that a spot strength or core cluster pattern exists is only one step in the process. Here are some additional things to consider:

Group Think

While large, individual businesses will always be important and drive some policy actions, decision-makers can use pattern knowledge to focus efforts on the common problems that related businesses have. This approach makes the best use of limited resources by providing the biggest impact to the most companies.

Customize Help

One size does not fit all when it comes to supporting an industry pattern. Assisting a business cluster may involve specific projects like expanding utilities or broader actions such as helping attract additional knowledge workers. Whatever the needs, the pattern approach can help prioritize actions.

Work on Workforce

Many business location or expansion decisions revolve around issues of available labor. Workforce training geared toward supporting clusters can be very valuable as many of the firms hire workers with similar skill sets. Likewise, talented workers want to locate where clusters of similar businesses offer better odds at finding employment.

Career centers, community colleges, and universities can customize training programs to meet the need of cluster industries for specialized workers.

Spread the Word

Economic and workforce developers can tell the story of how a region’s industries and institutions create clusters of opportunity for existing companies, workers, and new investment. Examples such as the Animal Health Corridor (Missouri-Kansas) and the Plant and Medical Sciences Cluster (St. Louis) are excellent branding campaigns that highlight the combined strengths of businesses, universities, incubators, and workforce to form clusters of growth.

Plan for the Future

The current recession reminds everyone that major structural changes in the economy will occur from time to time. Missouri’s automotive industry is undergoing that change right now. Developers that understand a region’s pattern of industries will be better positioned to promote new opportunities of growth that fit well with an economy’s existing and transforming strengths.

St. Louis Region

INDUSTRY OVERVIEW

The Saint Louis region is the most populated area of the state with 2,149,777 residents, just over 36 percent of state's population. In 2008 regional employment stood at 1,082,997, with the Health Care, Retail, and Manufacturing sectors employing one out of every three workers. While the majority of workers lived in Missouri, almost 8 percent lived outside the state.*

Historically a region strong in automotive manufacturing, St. Louis is undergoing an economic restructuring due to the recession which will alter the industry mix as the area rebounds. Luckily the economy is based on a variety of diverse, strong activities that will benefit the region well into the future.

St. Louis Region Industry Employment 2008				
NAICS	Industry	Annual Average Emp.	Percent Total Emp.	Annual Average Wage
11	Agriculture, Forestry, Fishing, and Hunting	1,350	0.1%	\$41,171
21	Mining	924	0.1%	\$116,705
22	Utilities	5,845	0.5%	\$65,405
23	Construction	63,999	5.9%	\$52,769
31-33	Manufacturing	109,358	10.1%	\$65,180
42	Wholesale Trade	50,494	4.7%	\$62,439
44-45	Retail Trade	115,094	10.6%	\$25,869
48-49	Transportation and Warehousing	41,748	3.9%	\$45,513
51	Information	30,669	2.8%	\$65,621
52	Finance and Insurance	52,360	4.8%	\$64,412
53	Real Estate and Rental and Leasing	17,134	1.6%	\$36,452
54	Professional, Scientific, and Technical Services	65,061	6.0%	\$72,168
55	Management of Companies and Enterprises	41,596	3.8%	\$119,285
56	Administrative and Support Services	63,645	5.9%	\$30,494
61	Educational Services	88,639	8.2%	\$43,190
62	Health Care and Social Assistance	144,161	13.3%	\$39,942
71	Arts, Entertainment, and Recreation	25,902	2.4%	\$34,065
72	Accommodation and Food Services	94,174	8.7%	\$14,791
81	Other Services	37,740	3.5%	\$27,271
92	Public Administration	33,109	3.1%	\$47,861
	TOTAL	1,082,997		\$47,243

* Local Employment Dynamics, U.S. Census Bureau, 2008.

St. Louis Region

INDUSTRY PATTERNS

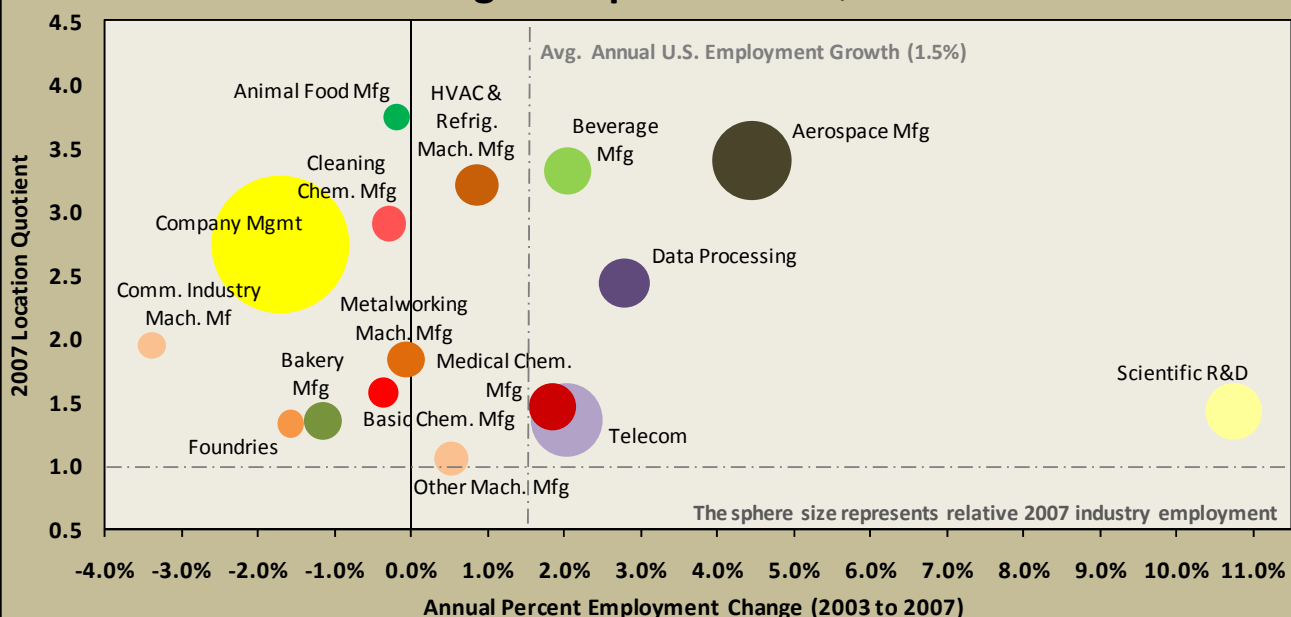
The story of any metropolitan's economy is complex, and St. Louis is no exception. While well-known companies such as Anheuser-Busch InBev, Enterprise Rent-a-Car, and Monsanto garner a great deal of the headlines, the St. Louis economy has a mix of business strengths that might be less understood.

As with most large urban centers, St. Louis is the home to many headquarter companies and supporting activities such as R/D, marketing, and information technology. What differentiates St. Louis is the unique mix of manufacturing and science expertise that has arisen in this metropolitan area based on a combination of surrounding resources.

Industry Pattern Type and Location Quotient (LQ)

TYPE	NAICS	INDUSTRY	LQ
Spot	3111	Animal Food Mfg.	3.7
Cluster	3118	Bakery Mfg.	1.4
Cluster	3121	Beverage Mfg.	3.3
Spot	3251	Basic Chemical Mfg.	1.6
Cluster	3254	Medical Chemical Mfg.	1.5
Cluster	3256	Cleaning Chemical Mfg.	2.9
Cluster	3315	Foundries	1.3
Cluster	3333	Comm. Industry Mach. Mfg.	1.9
Spot	3334	HVAC and Refrig. Mach. Mfg.	3.2
Cluster	3335	Metalworking Mach. Mfg.	1.8
Cluster	3339	Other Machinery Mfg.	1.1
Spot	3364	Aerospace Product Mfg.	3.4
Cluster	517	Telecommunications	1.4
Cluster	5182	Data Processing Services	2.4
Cluster	5417	Scientific Research and Dev.	1.4
Cluster	5511	Company Management	2.7

Saint Louis Region Top Location Quotient Patterns

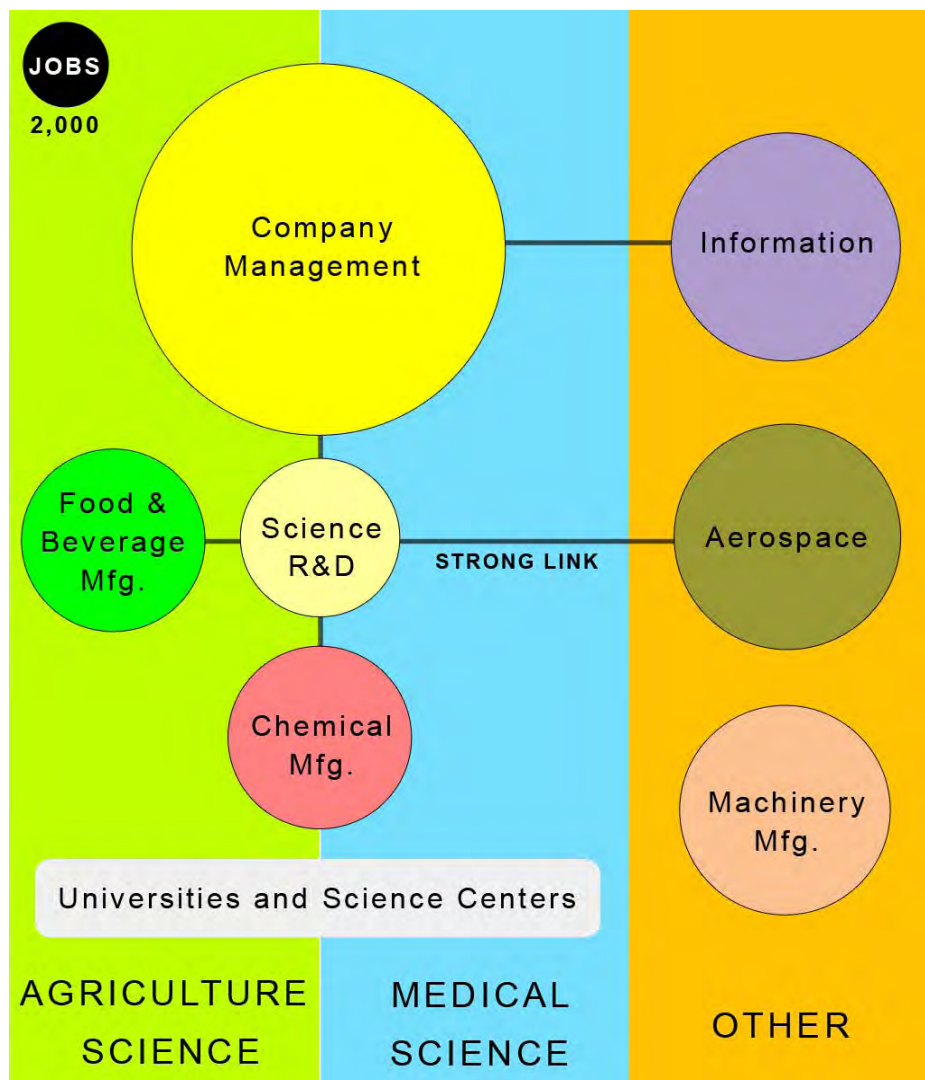


St. Louis Region

Although the table and bubble chart highlight patterns of industry strength, it is only part of the story. Through analysis of individual companies within each pattern, overarching clusters of **agricultural science** and **medical science** connect firms across sectors. These clusters do not fit neatly into individual NAICS sectors, making realistic employment and LQ calculations difficult, but are important parts of the St. Louis economic story.

The pattern diagram illustrates some of the strong cluster connections in agricultural and medical science, and other industries. Together these companies employ nearly 12 percent of the private sector. However, this percentage does not represent all cluster employment due to additional smaller industry linkages and the supporting work at universities, community colleges, hospitals, and non-profits that make these clusters feasible.

Pattern Diagram of Core Clusters and Spot Strengths





St. Louis Region

Agricultural Science Core Cluster

Animal Food Mfg. (NAICS 3111)

Bakeries and Tortilla Mfg. (NAICS 3118)

Beverage Mfg. (NAICS 3121)

Large Subgroup of Firms in:

Basic Chemical Mfg. (NAICS 3251)

Company Management (NAICS 5511)

Science R&D (NAICS 5417)

As a major export center for Midwest crops and locally developed agricultural chemicals and food products, it is no surprise that St. Louis has an Agricultural Science Core Cluster. Global companies such as Monsanto, Anheuser-Busch InBev, and Solae are well-known businesses as are state-of-the-art research facilities such as the Danforth Plant Science Center. Even though a handful of companies are commonly seen as the industry leaders, the number and size of private firms in the Agricultural Science cluster is well dispersed in the region.

This cluster contains many highly concentrated industry sectors and is closely tied to the strong agribusinesses located throughout Missouri and much of the Midwest. Except for Science R&D, most employment in the private sectors was weak during the last growth business cycle but long-term prospects do seem bright.

China and other developing markets had help drive up farm commodity prices before the global recession dampened demand in 2008. As the economies of the world rebound, however, demand will likely increase as more people in developing countries reach middle-class status. As agriculture and food manufacturing continues to advance scientifically, the St. Louis core cluster will be well positioned to play a key role.

Medical Science Core Cluster

Medical Chemical Mfg. (NAICS 3254)

Medical Equipment and Supplies Mfg. (NAICS 3391)

Large Subgroup of Firms in:

Company Management (NAICS 5511)

Science R&D (NAICS 5417)

The Medical Science Core Cluster is a diverse grouping of individual firms and organizations that provide medical manufactured products, management services, and advanced scientific research to clients throughout the world. Firms such as Express Scripts, Forest Pharmaceuticals, and Pfizer are well known companies in this cluster.

Pharmaceutical and medical equipment manufacturing make up the goods-producing sectors of this cluster and are growing modestly in employment. On the services side, private

St. Louis Region

medical management and research companies, bolstered by the health science conducted at major universities and hospitals, provide a strong base of knowledge for this core cluster.

As demand for general healthcare services increase in the U.S. and abroad, due to aging baby boomer populations and rising global standards of living, so will the demand for medical supplies and high-end services, both of which St. Louis has strengths in.

Industrial Machinery Manufacturing Core Cluster

Foundries (NAICS 3315)

Commercial and Service Industry Machinery Mfg. (NAICS 3333)

HVAC and Commercial Refrigeration Equipment Mfg. (NAICS 3334)

Metalworking Machinery Mfg. (NAICS 3335)

Other General Purpose Machinery Mfg. (NAICS 3339)

In St. Louis this core cluster creates machinery primarily used as an input or as equipment in the production of other manufactured goods. Machinery has been Missouri's third largest export for well over a decade, behind only transportation equipment and chemicals.

Since most machines are developed for specific applications, design is a key part of the production process in this cluster. The skilled workers and design needed to create advanced machinery exist in St. Louis and is fortunately found in a diverse set of industries.

Firms in this group are not directly tied to automotive production which has substantially diminished in employment over the past couple years. Although employment has declined, this industry has remained relatively strong in the St. Louis region due to the broader industries these companies serve. With strengths in climate control machinery, this core cluster may also benefit from efforts to improve energy efficiency in the U.S. and abroad.





St. Louis Region

Information Services Core Cluster

Telecommunications (NAICS 517)

Data Processing Services (NAICS 5182)

Subgroup of Firms in:

Company Management (NAICS 5511)

St. Louis has a diverse concentration of firms in telecommunications and data processing industries which offer services to national and international customers. This cluster has been growing in significance throughout the regional economy.

Telecommunications and data processing services, both of which grew at or above U.S. annual employment growth from 2003 to 2007, represent important strengths for the St. Louis economy. Although well-known firms such as AT&T and Charter Communication represent larger employers in this cluster, many other mid-sized firms specializing in finance, marketing, and other information technology (IT) services make this a diverse regional industry.

Continued strength in this cluster is highly desired due to the broader support information services provide to all industries and the potential for growth of high wage, high knowledge jobs in the region.

Aerospace Science Spot Strength

Aerospace Product Mfg. (NAICS 3364)

Subgroup of Firms in:

Science R&D (NAICS 5417)

The Aerospace Science industry employs a large and expanding workforce in the St. Louis region. Firms in this area of strength have grown at a faster rate than all other cluster industries from 2003 to 2007. Although private companies employ the most workers, recent public sector activities, such as the expansion of the National Geospatial-Intelligence Agency, have added new high-tech jobs as well.

Aerospace manufacturing and defense research are an important part of the local and state economy. The continued expansion of these industries into a broader mix of companies and public sector organizations can hopefully turn this spot strength into a core cluster that would offer longer-term stability.

St. Louis Region

INDUSTRY CONTRIBUTION IMPACT: SCIENTIFIC RESEARCH AND DEVELOPMENT

Scientific Research and Development has thrived in this region and particularly in engineering, biotechnology, agriculture, and medical sciences. This industry provides great employment by some of the top companies in the field and provides new products and insight for the state. Scientific Research and Development workers are the highest paid in the region with an average yearly wage just over \$119,000.

This industry has a great import to export ratio because many of the products and information produced goes to companies and institutes world-wide, as well as being a strong continual source of new revenue for the region.

An addition of 100 employees in scientific research and development creates a total of 229 jobs paying \$17.1 million in salaries and contributing over \$19.5 million to the gross state product.



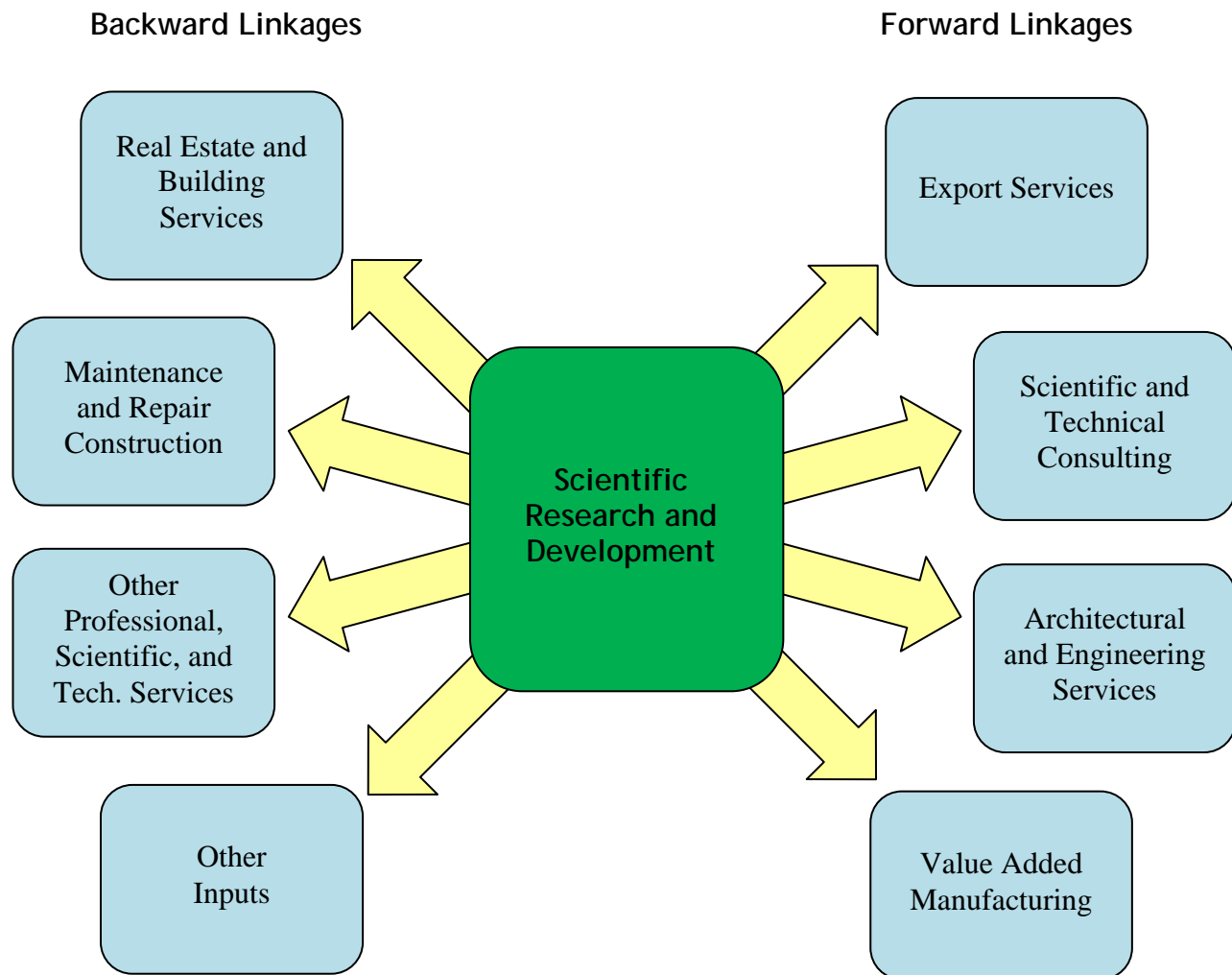
Scientific Research & Development Impact: Addition of 100 employees			
	Direct Impact	Indirect Impact	Total Impact
Employment	100	128.6	228.6
Labor Income*	\$11.9M	\$5.2M	\$17.1M
Gross Domestic Product	\$10.9M	\$8.6M	\$19.5M

*Labor income includes employee benefits and proprietors income.

St. Louis Region

INDUSTRY INTERLINKAGES: SCIENTIFIC RESEARCH AND DEVELOPMENT

Scientific Research and Development in the St. Louis region directly employs over 7,000 workers. Backward-linked (supply goods and services to the industry) and forward-linked (produce value-added goods for consumers) activities display the interrelationship between various industries that add value to scientific research and development. While the backward linkages are between the suppliers of services to the industry, forward linkages are between the industry and the consumers.



St. Louis Region

NOTES

Industry Analysis of a Region's Economic Core

While a business is classified by the primary service or product it creates, another distinction is the market it serves. Companies that target customers outside a region are considered export-based, or core, whereas other businesses mainly serve local customers. Grocery stores, retailers, and doctor's offices are typical examples of local market firms. The distinction between export and local market businesses is important when considering long range economic viability and development.

Export-market industries, by serving customers outside a region, bring new dollars into an economy and form the economic core of the community. Think of manufacturers and large-scale farming. Both industries serve national and global markets and therefore attract new income into the region that is paid out in wages, interests, rents, and profits. By contrast, a local market industry largely churns existing dollars within a region. While local services are absolutely important to a thriving community, seldom can an area's population maintain a robust economy by only selling things to each other; it has to export goods and services to bring in new wealth.

Defining Export-Market Industries

Although some businesses are commonly thought of as exporters, location quotient (LQ) analysis provides a more comprehensive approach. This quotient indicates how concentrated an industry's employment is in a certain area as compared to the U.S. average. If an industry has an LQ of 2.0 then it is twice as concentrated in employment as the U.S. average.

Location Quotient

$\frac{\text{Regional Employment}_{\text{INDUSTRY}}}{\text{Regional Employment}_{\text{TOTAL}}}$	$\frac{\text{U.S. Employment}_{\text{INDUSTRY}}}{\text{U.S. Employment}_{\text{TOTAL}}}$
--	--

Location quotients can help identify regional industries that may be exporting a substantial amount of goods and services to outside markets. If an industry is much more concentrated than the national average, firms are likely creating more products than the local economy can consume. Industries typically considered as primary exporters include:

Large Agriculture and Forestry Operations

Mining

Manufacturing

Management Headquarters

Tourism*

**High retail/restaurant LQ associated with destination spots.*



St. Louis Region

The list of primary exporters should be supplemented with LQ analysis to determine other industries that may be generating a large amount of income from outside a region. Services such as information technology, design and engineering, and research are often examples in metropolitan areas.

Identifying Industry Patterns

The industries with the highest LQ and combined employment were analyzed in the context of the region's economy and knowledge of individual firms to determine if an industry pattern existed. Employment from 2003-2007 was analyzed to coincide with Missouri's growth period during the last business cycle and to control for more recent recessionary effects. However, first quarter 2009 employment and business closures were reviewed to see if a pattern had greatly diminished due to major structural changes after the period of primary analysis.

Spot Strengths were identified as high LQ and employment sectors where 3 or fewer companies employed over 80 percent of the industry's workforce. Spot firm employment or wage information cannot be disclosed due to confidentiality restrictions in the QCEW program. However, this report does try to identify those firm's connections to larger clusters where applicable.

Spot firms employ a large percentage of workers and attract supply chain industries. These businesses are so prominent in a local economy, think of "factory towns," that the firms can overshadow other regional industries. If a Spot business moves out of an area then the industry concentration (LQ) leaves with it, thereby introducing a vulnerability to the region's economy.

Core Cluster patterns takes into account the number of businesses and employment within the region that make up an industry concentration. Cluster businesses are more diversified in firm count. Three or less firms do not account for over 80 percent of industry employment.

Core clusters benefit from the transfer of knowledge and a shared, skilled workforce that close proximity brings. Supply chains develop to serve these companies and competition keeps prices down. Experienced industry entrepreneurs periodically dream up better products, spin-off new local firms, and grow the economic core of a community.

While all companies are influenced by larger economic trends, having a number of similar businesses in an area helps diversify the risk and rewards as each company focuses on specialized products. These core cluster businesses collectively benefit from supporting services and workforce training that is tailored to common industry needs.



St. Louis Region

SOURCES

1. Quarterly Census of Employment and Wages, 2003-2008 Annual Averages, Bureau of Labor Statistics. The location quotient, cluster summaries and chart are based on 2007 employment and 2003-2007 trends to capture information during the last growth cycle and control for recessionary effects. Location quotient analyzed using the BLS Regional Data Analysis Tool (RDAT).
2. Local Employment Dynamics Program, 2008, U.S. Census Bureau.
3. International trade data, 1997-2008, WISERTrade.
4. IMPLAN Economic Impact Model, 2007, MIG Inc.

Fall 2009

Primary Research: Scott Glosemeyer
Graphic Design: Maggie Lear
Editing: Sreedhar Upendram and Alan Spell

Missouri Economic Research and Information Center
Department of Economic Development, Division of Business and Community Services



PATTERN ANALYSIS

HIGHLIGHTING INDUSTRY PATTERNS THAT DRIVE NEW
WEALTH IN A REGIONAL ECONOMY

UPPER SOUTH CENTRAL
REGION



Upper South Central Region

AN INTRODUCTION TO INDUSTRY PATTERN ANALYSIS

Discovering patterns of connected industries can be difficult given the number of companies in an economy and the data available for analysis. Yet understanding the business patterns that drive wealth in a region is critical to designing effective development initiatives.

This report uses industry trend, concentration, and individual firm data to summarize two important patterns in a region's economic core:

- **Spot Strengths** of large sector employment, typically in one or two firms, and
- **Core Clusters** of employment across a mix of similar or linked industries.

Recognizing spot strengths and core cluster patterns is important as these collectively large employers attract new income to a region. Knowing these industries, and the shared supply-chain and labor issues these companies have, can aid economic and workforce developers in crafting policies for the broadest impact.

Pattern analysis highlights the strengths and linkages of area industries and can serve as a starting point for understanding a regional economy. People familiar with company operations know that no two firms have the same business model. Pattern information should ultimately be enhanced by individuals with local business knowledge.

See the **NOTES** section for more details on industry pattern analysis and the methods used in this report.





Upper South Central Region

What comes after “Pattern Recognition?”

Economic and workforce developers have been speaking the “cluster” language for a long time. However, just knowing that an industry pattern exists is only one step in the process. Here are some additional things to consider:

Group Think

While large, individual businesses will always be important and drive some policy actions, decision-makers can use pattern knowledge to focus efforts on the common problems that related businesses have. This approach makes the best use of limited resources by providing the biggest impact to the most companies.

Customize Help

One size does not fit all when it comes to supporting an industry pattern. Assisting a business cluster may involve specific projects like expanding utilities or broader actions such as helping attract additional knowledge workers. Whatever the needs, the pattern approach can help prioritize actions.

Work on Workforce

Many business location or expansion decisions revolve around issues of available labor. Workforce training geared toward supporting clusters can be very valuable as many of the firms hire workers with similar skill sets. Likewise, talented workers want to locate where clusters of similar businesses offer better odds at finding employment.

Career centers, community colleges, and universities can customize training programs to meet the need of cluster industries for specialized workers.

Spread the Word

Economic and workforce developers can tell the story of how a region’s industries and institutions create clusters of opportunity for existing companies, workers, and new investment. Examples such as the Animal Health Corridor (Missouri-Kansas) and the Plant and Medical Sciences Cluster (St. Louis) are excellent branding campaigns that highlight the combined strengths of businesses, universities, incubators, and workforce to form clusters of growth.

Plan for the Future

The current recession reminds everyone that major structural changes in the economy will occur from time to time. Missouri’s automotive industry is undergoing that change right now. Developers that understand a region’s pattern of industries will be better positioned to promote new opportunities of growth that fit well with an economy’s existing and transforming strengths.

Upper South Central Region

INDUSTRY OVERVIEW

The Upper South Central region has a population of 235,921 which accounts for approximately four percent of Missouri's total population. Economic centers include Lebanon and Rolla, where 11.4 and 11.2 percent of area residents work, respectively, to Osage Beach (6.2 percent).* The average wage in 2008 was \$28,374, lower than the state average of \$40,710.

There were 79,164 employees in the region in 2008, most working in the related sectors of retail, accommodations, and restaurants (28.9 percent) followed by health care (13.2 percent). Manufacturing was also a large sector employing nearly 12 percent of area workers, particularly in Lebanon.

Aside from standard industry measures, this region's economy is strongly influenced by Lake of the Ozarks tourism, the large Fort Leonard Wood Army post, and the Missouri University of Science and Technology in Rolla.

Upper South Central Region Industry Employment 2008				
NAICS	Industry	Annual Avg. Emp.	Perc. Total Emp.	Annual Avg. Wage
11	Agriculture, Forestry, Fishing, and Hunting	220	0.3%	\$22,026
21	Mining	116	0.1%	\$30,455
22	Utilities	594	0.8%	\$48,959
23	Construction	4,703	5.9%	\$28,820
31-33	Manufacturing	9,405	11.9%	\$31,923
42	Wholesale Trade	2,093	2.6%	\$35,381
44-45	Retail Trade	12,631	16.0%	\$22,192
48-49	Transportation and Warehousing	2,942	3.7%	\$34,744
51	Information	1,093	1.4%	\$28,151
52	Finance and Insurance	2,273	2.9%	\$35,246
53	Real Estate and Rental and Leasing	1,023	1.3%	\$21,455
54	Professional, Scientific, and Technical Services	1,730	2.2%	\$35,150
55	Management of Companies and Enterprises	237	0.3%	\$42,160
56	Administrative and Support Services	2,332	2.9%	\$21,030
61	Educational Services	7,839	9.9%	\$34,598
62	Health Care and Social Assistance	10,418	13.2%	\$33,379
71	Arts, Entertainment, and Recreation	1,563	2.0%	\$24,148
72	Accommodation and Food Services	10,219	12.9%	\$14,007
81	Other Services	2,384	3.0%	\$19,740
92	Public Administration	5,350	6.8%	\$40,534
TOTAL		79,164		\$28,374

* Local Employment Dynamics, U.S. Census Bureau, 2008.

Upper South Central Region

INDUSTRY PATTERNS

Business analysis revealed six pattern industries in the region. Three manufacturing strengths include Machinery, Electrical Equipment, and Transportation Equipment production. The logistical services of Warehousing and Truck Transportation are a significant pattern as well. Tourism is the largest employing cluster primarily due to the Lake of the Ozarks.

Industry Pattern Type and Location Quotient (LQ)

TYPE	NAICS	INDUSTRY	LQ
Spot	333	Machinery Manufacturing	3.9
Spot	335	Electrical Equip. Mfg.	5.6
Cluster	336	Transportation Equip. Mfg.	2.0
Cluster	484	Truck Transportation	1.9
Spot	493	Warehousing & Storage	3.2
Cluster		Tourism	1.5

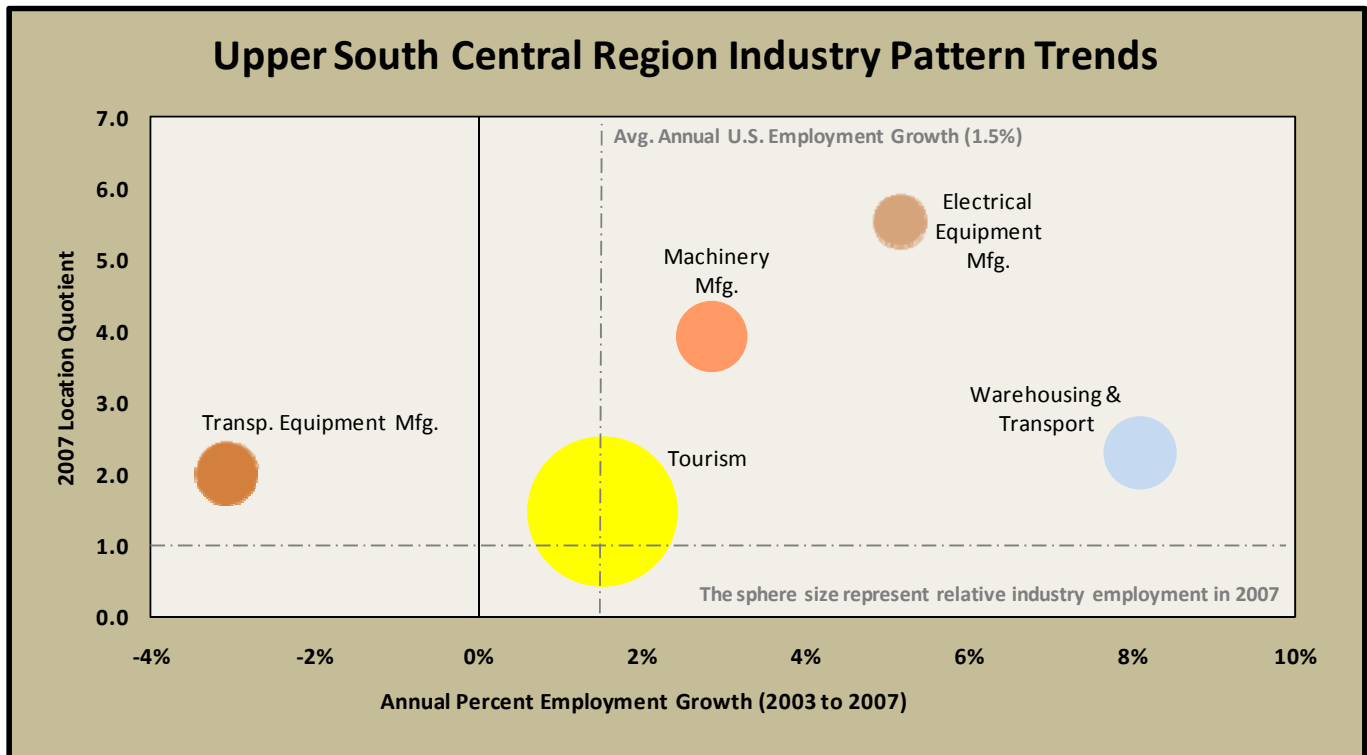
These core cluster and spot industries account for 31 percent of all private employment in the region.* While attributing exact retail employment figures to tourism is problematic, it is worth noting that retail and tourism employ a combined 38 percent of all regional private sector workers.

Pattern Summary

Pattern	Machinery Mfg.	Electrical Equip. Mfg.	Transportation Equip. Mfg.	Warehousing & Transportation	Tourism
Industry	Machinery Manufacturing (Spot Strength)	Electrical Equipment and Appliance Manufacturing (Spot Strength)	Transportation Equipment Manufacturing	Warehousing, Storage, and Truck Transportation	Tourism-Related Industries
Location Quotient	3.9	5.6	2.0	2.3	1.5
Employment	ND*	ND*	1,886	2,638	11,215
Avg. Wage	ND*	ND*	\$30,083	\$34,692	\$14,106
Description	Create end products that apply multiple mechanical forces such as forging, stamping, bending, forming, and machining processes. Welding and assembling are often used to join separate parts together.	Manufacture products that generate, distribute and use electrical power to include lighting, appliances, power distribution components, transformers, etc.	Produce and assemble metal, plastic, and other material components into finished transportation equipment. Includes the manufacture of road, rail, air, or water vehicles primarily used for transporting people or goods.	Engaged in operating warehousing and storage facilities for general merchandise and other products. Truck transportation provides over-the-road movement of cargo using motor vehicles, such as trucks and trailers.	Food Services, Accommodations, Specialty Retail and Travel, and Entertainment Services related to a Destination Tourist Location

* Precise spot industry employment and wages are non-disclosable (ND) due to state and federal confidentiality requirements.

Upper South Central Region



Machinery Manufacturing Spot Strength

Machinery Manufacturing (NAICS 333)

Machinery manufacturing is a highly specialized spot strength in the region with an LQ of 3.9. Employment grew by 2.8 percent on an annual basis from 2003 to 2007, almost double the national growth rate. However, the recession has impacted these firms significantly and job growth going forward will bear watching. Some employment has rebounded in the latter part of 2009.

Some specialties of local machinery manufacturers include heating and cooling equipment, and custom tooling for a variety of industries.

Electrical Equipment and Appliance Manufacturing Spot Strength

Electrical Equipment and Appliance Manufacturing (NAICS 335)

This manufacturing sector is over five times more concentrated in the Upper South Central region than the national average. Electrical equipment manufacturing is a spot strength in the area however employment is more dispersed than in the machinery manufacturing firms.



Upper South Central Region

From 2003 to 2007 regional employment grew at an annual rate of 5.2 percent, whereas national employment in electronic equipment manufacturing declined. These factors helped the region's industry LQ increase from 4.4 to 5.6 over the four years. As with machinery manufacturing, the recession has decreased employment.

Companies in the area specialize in variety of applications such as electric motors, electric utility components, and small appliances. Many companies have diversified products serving the automotive, appliance, food products, and commercial machinery manufacturing industries.

Transportation Equipment Manufacturing Core Cluster

Transportation Equipment Manufacturing (NAICS 336)

Transportation equipment manufacturing encompasses rail, road, air, and water vehicle production and assembly. In this region the cluster, with an LQ just over 2.0, is primarily focused on boat building.

The specialized sector of boat manufacturing has seen employment declines much of last decade but not to the extent of automobile makers. This region does have a number of firms that primarily supply the automotive sector so more drastic declines in employment during the recession are not surprising. Even with the loss of jobs, the transportation equipment manufacturers still had sizable employment in the second half of 2009.

Warehousing and Transportation Core Cluster

Warehousing and Storage (NAICS 493) and Truck Transportation (NAICS 484)

The related activities of warehousing and truck transportation form a high-growth core cluster in the Upper South Central Region. It is the second largest employing pattern industry with an outstanding annual growth rate of 8.1 percent during the last business cycle. The cluster also pays wages slightly above most manufacturers.

Truck transportation activities can serve regional markets with short-haul services (typically less than 100 miles) and national markets with longer hauls. Trucking services provide a key logistics input for many commodity-based and manufacturing industries. In this region, the majority of small-to-mid sized firms specialize in long-haul activities, thereby generating income from companies outside the region.

The recession also impacted jobs in this cluster, particularly in long-haul trucking, as demand for products declined. As the economy improves, trucking businesses should be in a good position for growth.



Upper South Central Region

Tourism Core Cluster

53 Detailed NAICS Industries - See Notes Section for Details

Tourism has historically been a strong industry in the region, driven by water sports at the Lake of the Ozarks, scenic rivers, and other attractions. These activities spawned growth in restaurants, lodging, tourist services, and specialty retailers. These businesses and lake home building spurred growth in the construction sector as well. The 2007 Tourism LQ was 1.48, down slightly from 1.54 in 2003.

Roughly centered between the St. Louis, Kansas City, Springfield, and Columbia/Jefferson City metropolitan areas, the Lake of the Ozarks serves as a weekend destination for many Missourians. Military personnel from nearby posts and university students also provide an on-going source of new income to the area.

Tourism-related employment represents just over 18 percent of area private-sector jobs.* The average pay of \$14,106 is reflective of the seasonality and part-time nature of the industry, particularly around the lake. Tourism employment grew at an annual rate of 1.5 percent from 2003 to 2007.

The Lake of the Ozarks is a tourism destination for 11 percent of all Missouri travelers, according to a 2008 Division of Tourism study.[†] As the baby boomer generation leaves the workforce in large numbers over the next decade, the Upper South Central region will likely see an increase in the amount of travelers visiting the area as well more year-round retirees.

* Estimates based on 53 NAICS-defined industries from DED and the Economic Impact of Missouri's Tourism and Travel Industry - FY08. 2009. Michael Kaylen, University of Missouri.

† [Where Do Travelers Go in Missouri--CY08](#), Visitor Profiles, Division of Tourism, Missouri Dept. of Economic Development.

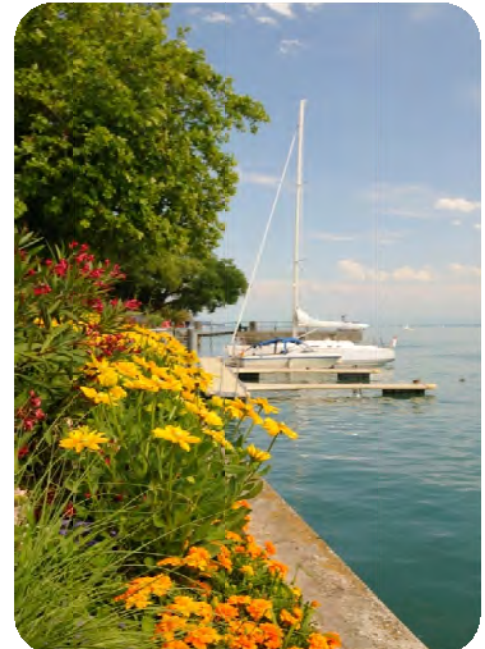
Upper South Central Region

INDUSTRY CONTRIBUTION IMPACT: TOURISM

Pattern recognition is important since changes to business production can have broad regional impacts across a range of linked industries and institutions. Tourism is analyzed in this example of how those connections positively influence the area's economy.

Tourism consists of lodging, entertainment, shopping, food services and drinking establishment, gambling, and recreational activities. The industry attracts tourists from outside the region for retail outlet shopping and water sports, thereby bringing new money into the area economy.

An addition of 100 employees in tourism-related industries creates an estimated total of 123 jobs paying \$2.7 million in salaries and contributing over \$5.5 million to the gross state product.



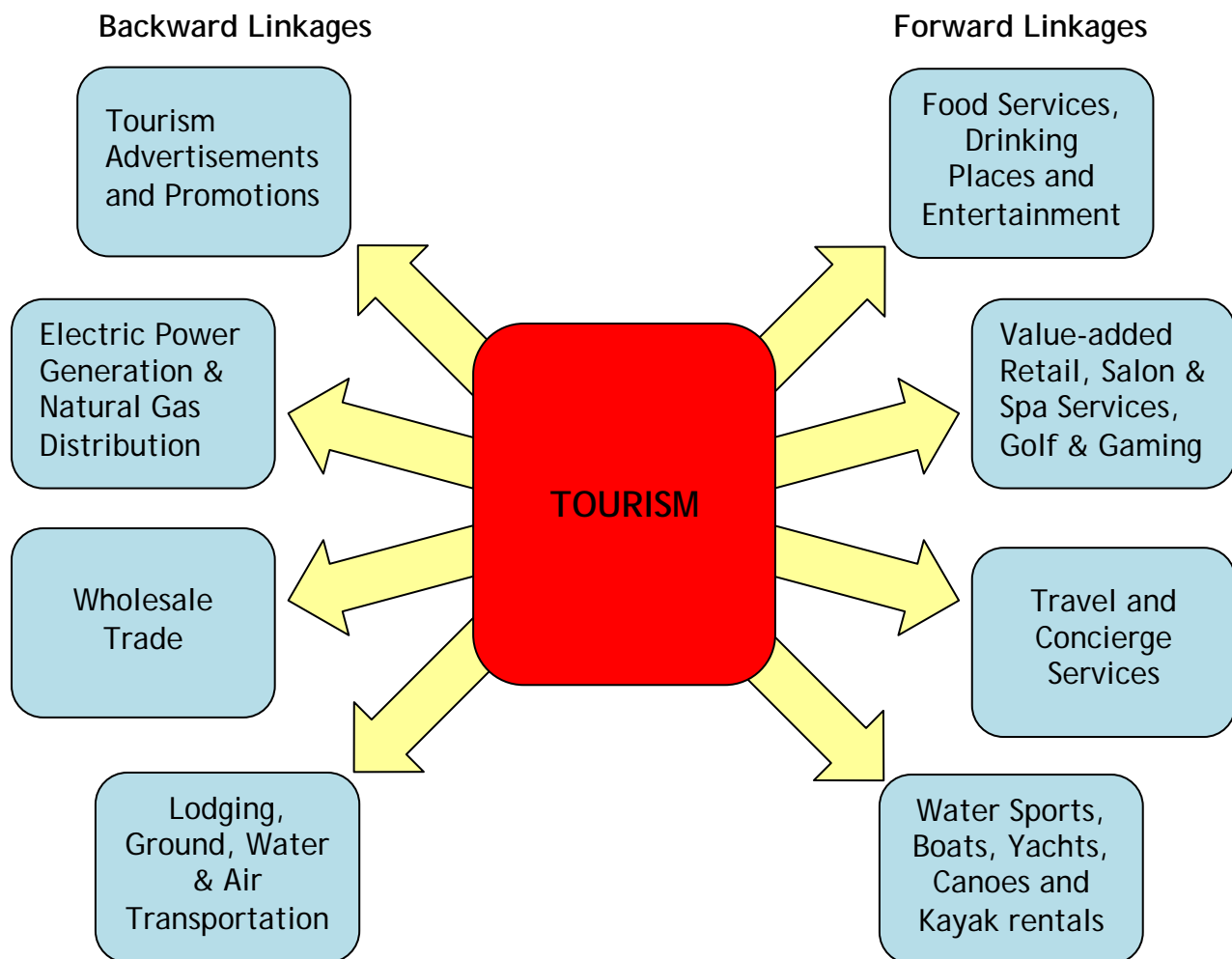
Tourism Impact: Addition of 100 employees			
	Direct Impact	Indirect Impact	Total Impact
Employment	100	23	123
Labor Income*	\$2.0M	\$0.7M	\$2.7M
Gross Domestic Product	\$4.3M	\$1.2M	\$5.5M

*Labor income includes employee benefits and proprietors income.

Upper South Central Region

INDUSTRY INTERLINKAGES: TOURISM

Tourism-related industries in the Upper South Central employ 11,215 workers. Backward-linked (supply goods and raw materials to the industry) and forward-linked (produce value-added goods and services for consumers) activities display the interrelationship between various industries that add value to tourism. While the backward linkages are between the suppliers of raw materials to the industry, forward linkages are between the industry and the consumers. The illustration below demonstrates some of the business linkages typically in the tourism industry.



Upper South Central Region

NOTES

Industry Analysis of a Region's Economic Core

While a business is classified by the primary service or product it creates, another distinction is the market it serves. Companies that target customers outside a region are considered export-based, or core, whereas other businesses mainly serve local customers. Grocery stores, retailers, and doctor's offices are typical examples of local market firms. The distinction between export and local market businesses is important when considering long range economic viability and development.

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Although some businesses are commonly thought of as exporters, location quotient (LQ) analysis provides a more comprehensive approach. This quotient indicates how concentrated an industry's employment is in a certain area as compared to the U.S. average. If an industry has an LQ of 2.0 then it is twice as concentrated in employment as the U.S. average.

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Location quotients can help identify regional industries that may be exporting a substantial amount of goods and services to outside markets. If an industry is much more concentrated than the national average, firms are likely creating more products than the local economy can consume. Industries typically considered as primary exporters include:

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Mining

Manufacturing

Management Headquarters

Tourism*

**High retail/restaurant/accommodations LQs associated with destination entertainment spots.*



Upper South Central Region

The list of primary exporters should be supplemented with LQ analysis to determine other industries that may be generating a large amount of income from outside a region. Services such as information technology, design and engineering, and research are often examples in metropolitan areas.

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The industries with the highest LQ and combined employment were analyzed in the context of the region's economy and knowledge of individual firms to determine if an industry pattern existed. Employment from 2003-2007 was analyzed to coincide with Missouri's growth period during the last business cycle and to control for more recent recessionary effects. However, third quarter 2009 employment and business closures were reviewed to see if a pattern had greatly diminished due to major structural changes after the period of primary analysis.

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While all companies are influenced by larger economic trends, having a number of similar businesses in an area helps diversify the risk and rewards as each company focuses on specialized products. These core cluster businesses collectively benefit from supporting services and workforce training that is tailored to common industry needs.

Upper South Central Region

Tourism- Related Industries

53 industries were defined as tourism-related for this report. Industries are indicated below at the 6 digit NAICS level, the most detailed industry classification. NAICS derived from combination of Department of Economic Development and University of Missouri sources.

NAICS DESCRIPTION	NAICS DESCRIPTION
114210 Hunting and trapping	712130 Zoos and botanical gardens
312120 Breweries	712190 Nature parks and similar institutions
312130 Wineries	713110 Amusement and theme parks
453220 Gift, novelty, and souvenir stores	713120 Amusement arcades
487110 Scenic and sightseeing transp., land	713210 Casinos, except casino hotels
487210 Scenic and sightseeing transp., water	713290 Other gambling industries
487990 Scenic and sightseeing transp., other	713910 Golf courses and country clubs
532292 Recreational goods rental	713920 Skiing facilities
561510 Travel agencies	713930 Marinas
561520 Tour operators	713940 Fitness and recreational sports centers
561591 Convention and visitors bureaus	713990 All other amusement and rec. industries
561599 All other travel arrangement services	721110 Hotels and motels, except casino hotels
611620 Sports and recreation instruction	721120 Casino hotels
611699 Miscellaneous schools and instruction	721191 Bed-and-breakfast inns
711110 Theater companies and dinner theaters	721199 All other traveler accommodation
711120 Dance companies	721211 RV parks and campgrounds
711130 Musical groups and artists	721214 Recreational and vacation camps
711190 Other performing arts companies	721310 Rooming and boarding houses
711211 Sports teams and clubs	722110 Full-service restaurants
711212 Racetracks	722211 Limited-service restaurants
711219 Other spectator sports	722212 Cafeterias
711310 Promoters with facilities	722213 Snack and nonalcoholic beverage bars
711320 Promoters without facilities	722310 Food service contractors
711410 Agents and managers for public figures	722320 Caterers
711510 Independent artists and writers	722330 Mobile food services
712110 Museums	722410 Drinking places, alcoholic beverages
712120 Historical sites	

Upper South Central Region

SOURCES

1. Quarterly Census of Employment and Wages, 2003-2008 Annual Averages, Bureau of Labor Statistics. The location quotient, cluster summaries and chart are based on 2007 employment and 2003-2007 trends to capture information during the last growth cycle and control for recessionary effects. Location quotient analyzed using the BLS Regional Data Analysis Tool (RDAT).
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3. Economic Impact of Missouri's Tourism and Travel Industry: July 2007 - June 2008 (FY08). February 2009. Michael Kaylen, University of Missouri.
4. IMPLAN Economic Impact Model, 2007, MIG Inc.

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Primary Research: Alan Spell
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PATTERN ANALYSIS

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Department of Economic Development

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Southwest Region

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Customize Help

One size does not fit all when it comes to supporting an industry pattern. Assisting a business cluster may involve specific projects like expanding utilities or broader actions such as helping attract additional knowledge workers. Whatever the needs, the pattern approach can help prioritize actions.

Work on Workforce

Many business location or expansion decisions revolve around issues of available labor. Workforce training geared toward supporting clusters can be very valuable as many of the firms hire workers with similar skill sets. Likewise, talented workers want to locate where clusters of similar businesses offer better odds at finding employment.

Career centers, community colleges, and universities can customize training programs to meet the need of cluster industries for specialized workers.

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Economic and workforce developers can tell the story of how a region’s industries and institutions create clusters of opportunity for existing companies, workers, and new investment. Examples such as the Animal Health Corridor (Missouri-Kansas) and the Plant and Medical Sciences Cluster (St. Louis) are excellent branding campaigns that highlight the combined strengths of businesses, universities, incubators, and workforce to form clusters of growth.

Plan for the Future

The current recession reminds everyone that major structural changes in the economy will occur from time to time. Missouri’s automotive industry is undergoing that change right now. Developers that understand a region’s pattern of industries will be better positioned to promote new opportunities of growth that fit well with an economy’s existing and transforming strengths.

Southwest Region

INDUSTRY OVERVIEW

The Southwest region has a population of 324,651 which accounts for 5.42 percent of Missouri's total population. There are 125,227 employees, with a high concentration of these in Joplin, the region's leading economic hotspot.* The average wage in 2008 was \$30,453.

The region's economic landscape consists of agribusiness, manufacturing, logistics, and a variety of industries within company management. Primary farming, while not included in standard industry measures, is very important to the region as over 14,600 people were estimated to be either a farm owner or worker in 2007.** Manufacturing was the largest employer, accounting for over 1 in 5 jobs, more than any other economic region in Missouri.

NAICS	Industry	Annual Avg. Emp.	Perc. Total Emp.	Annual Avg. Wage
11	Agriculture, Forestry, Fishing, and Hunting	2,116	1.7%	\$27,663
21	Mining	226	0.2%	\$38,222
22	Utilities	799	0.6%	\$50,472
23	Construction	4,989	4.0%	\$32,254
31-33	Manufacturing	27,002	21.6%	\$35,078
42	Wholesale Trade	3,983	3.2%	\$37,025
44-45	Retail Trade	16,417	13.1%	\$21,374
48-49	Transportation and Warehousing	9,267	7.4%	\$42,217
51	Information	1,584	1.3%	\$33,768
52	Finance and Insurance	3,513	2.8%	\$36,145
53	Real Estate and Rental and Leasing	955	0.8%	\$20,666
54	Professional, Scientific, and Technical Services	2,233	1.8%	\$35,362
55	Management of Companies and Enterprises	2,449	2.0%	\$55,366
56	Administrative and Support Services	5,298	4.2%	\$20,016
61	Educational Services	9,880	7.9%	\$31,160
62	Health Care and Social Assistance	17,137	13.7%	\$34,155
71	Arts, Entertainment, and Recreation	915	0.7%	\$14,904
72	Accommodation and Food Services	9,322	7.4%	\$11,372
81	Other Services	3,335	2.7%	\$17,040
92	Public Administration	3,808	3.0%	\$30,962
TOTAL		125,227		\$30,453

* Local Employment Dynamics, U.S. Census Bureau, 2008.

** The most accurate and timely industry employment numbers come from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages program (QCEW). However, reporting requirements for this program excludes most farmers so the USDA 2007 Census of Agriculture is used as an alternative, non-comparative measure.

Southwest Region

INDUSTRY PATTERNS

The Southwest region is home to a diverse set of industry clusters. While a strong manufacturing presence has a significant impact on the region, other clusters such as truck transportation and animal production contribute greatly as well.

These core clusters and spot industries account for 27 percent of all private employment in the region.*

Industry Pattern Type and Location Quotient (LQ)

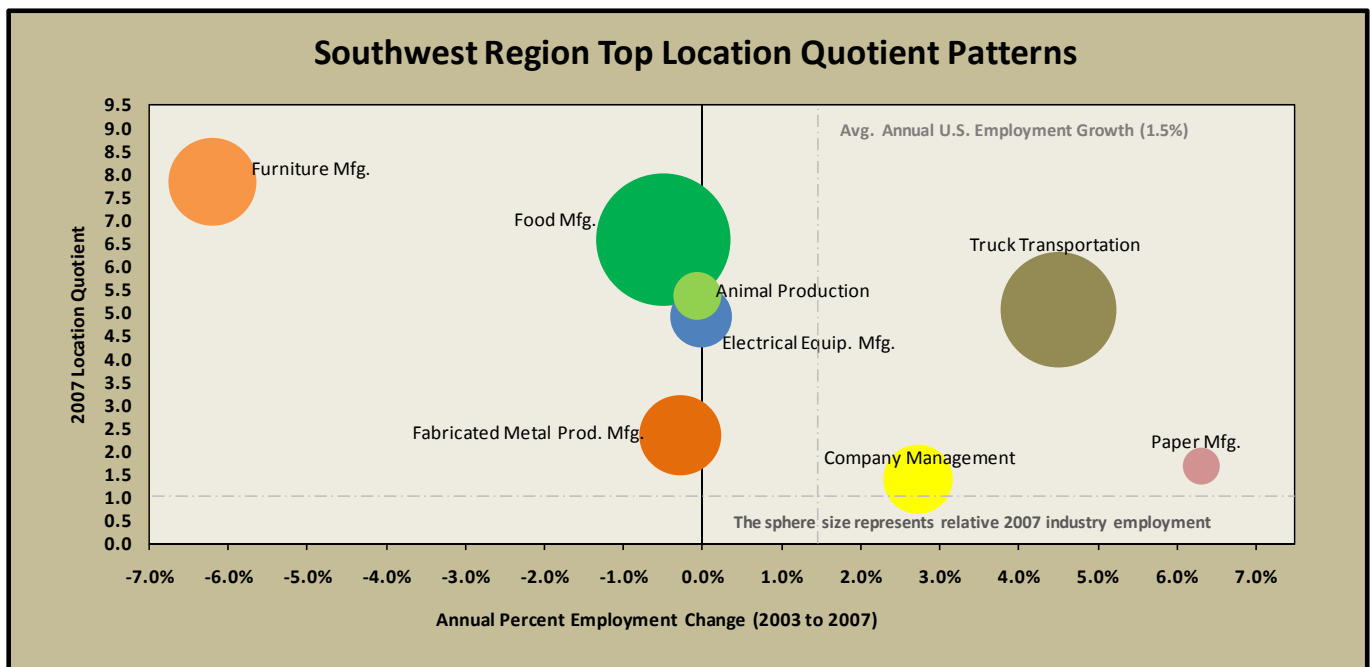
TYPE	NAICS	INDUSTRY	LQ
Cluster	112	Animal Production	5.4
Cluster	311	Food Mfg.	6.6
Spot	322	Paper Mfg.	1.7
Cluster	332	Fabricated Metal Product Mfg.	2.3
Spot	337	Furniture Mfg.	7.8
Spot	335	Electrical Equipment Mfg.	4.9
Cluster	484	Truck Transportation	5.1
Spot	551	Company Management	1.4

Cluster Summary

Pattern	Agribusiness		Paper Mfg.	Furniture and Related Industries		Electrical Equip. Mfg.	Truck Transp.	Company Mgmt.
Industry	Animal Production	Food Mfg.	Paper Mfg.	Furniture Mfg.	Fabricated Metal Product Mfg.	Electrical Equipment Mfg.	Truck Transportation	Company Mgmt.
Location Quotient	5.4	6.6	1.7	7.8	2.3	4.9	5.1	1.4
Employment	1,130	9,186	NA	NA	3,435	NA	6,887	NA
Avg. Wage	\$29,717	\$30,456	NA	NA	\$39,225	NA	\$43,009	NA
Description	Involved in the raising or fattening of animals for the sale of animals or animal products.	Transformation of livestock or agricultural goods into products for intermediate or final consumption.	Manufacture pulp, paper, or converted paper products.	Make furniture and related articles, such as mattresses, window blinds, cabinets, and fixtures by cutting, bending, molding, laminating, and assembly of wood, metal, glass, plastics, and rattan.	Transform metal into intermediate or end products by forging, stamping, bending, forming, and machining, used to shape individual pieces of metal.	Manufacture products that generate, distribute and use electrical power to include lighting, appliances, power distribution components, transformers, etc.	Provides over-the-road transportation of cargo using motor vehicles, such as trucks and trailers.	Establishments that hold the securities of enterprises, administer, oversee, and manage companies, or those that do both.

* Spot industry employment by detailed sector is not reportable due to BLS confidentiality restrictions.

Southwest Region



Agribusiness Cluster

Animal Production (NAICS 112)

Food Manufacturing (NAICS 311)

The agribusiness cluster consists of animal production and food manufacturing. Animal production, a primary input for food manufacturing, involves the raising or fattening of animals on ranches, farms, and feedlots for the sale of animals and animal products.* In the Southwest region, poultry hatcheries and turkey production make up the overwhelming majority of this industry, with 70 percent. Though this industry didn't show any employment growth between 2003 and 2007, it continues to add significant employment to the region.

Food manufacturing is the region's leading cluster in terms of employment. Like animal production, this industry lagged behind the U.S. average annual growth rate between 2003 and 2007. Even with a slight decrease, food manufacturing continues to be highly concentrated, 2nd to only furniture manufacturing in the region. Almost 60 percent of the employment in this industry comes from poultry processing.

* Crop and animal production employment used in the summary and location quotient are from the Quarterly Census of Employment and Wages (QCEW) and does not capture most farm production employment. The U.S. 2007 Census of Agriculture indicated that a combined total of 14,634 farm owners and hired labor worked in the Southwest Region but due to different collection methodologies cannot be directly added to the QCEW. However, the Agriculture Census employment numbers do highlight the greater significance of farm production to the region's economy.



Southwest Region

Paper Manufacturing Cluster

Paper Manufacturing (NAICS 322) SPOT STRENGTH

Paper manufacturing is one of four spot strengths in Southwest Missouri. Though it has the least employment of all clusters in the region, it has had the highest growth rate between 2003 and 2007.

This industry includes companies that make pulp, paper, and converted paper products such as boxes, paper bags, stationary, and sanitary paper. These three distinct functions are grouped together, as they constitute a series of vertically connected processes. Most of the employment in this cluster falls under the manufacturing of converted paper products.

Furniture and Related Industries Cluster

Furniture Manufacturing (NAICS 337) SPOT STRENGTH

Fabricated Metal Product Manufacturing (NAICS 332)

The furniture and related industries cluster is made up of two industries - furniture manufacturing and fabricated metal product manufacturing. While these industries may not seem to have many similarities on the surface, the latter supplies many of the inputs used in the former.

Companies in furniture manufacturing also make mattresses, window blinds, cabinets, and fixtures. Materials used to make these products include wood, metal, glass, and plastics. With an LQ of 7.8, furniture manufacturing had the highest job concentration of all clusters in 2007. However, employment did decline over the 2003 to 2007 time period.

Fabricated metal product manufacturing transforms metal into both intermediate and end products. Between 2003 and 2007 this industry showed annual employment losses while maintaining some of the highest employment in the region. The concentration for fabricated metal manufacturing in the Southwest region was twice that of the national average.

Truck Transportation Cluster

Truck Transportation (NAICS 484)

Trucking services provide a key logistics input for many commodity-based and manufacturing industries. In the Southwest region, over 85 percent of trucking employment is in either general or specialized long-distance trucking.

Truck transportation is one of the Southwest region's major industries. Not only does it have the 2nd highest employment in the region, it also had the 2nd highest average growth rate

Southwest Region

between 2003 and 2007. With an average wage of over \$43,000, these firms also pay well above most other pattern industries in the region.

Electrical Equipment Manufacturing Cluster

Electrical Equipment Manufacturing (NAICS 335) SPOT STRENGTH

Industries in electrical equipment manufacturing create products that generate, distribute and use electrical power. This cluster showed little employment change between 2003 and 2007. Within the Southwest region, companies in this spot strength manufacture batteries, motors, lighting, and household cooking appliances.

While this pattern is a spot strength in the area, it is linked to other electrical equipment manufacturers throughout Missouri which together form a strong industry cluster. In 2008 this statewide pattern employed nearly 13,000 workers and had an LQ over 1.5.

Electrical Equipment Manufacturing Pattern Strength Regions



Company Management

Company Management (NAICS 551) SPOT STRENGTH

This industry is made up of holding companies, or companies that administer, oversee, or manage other companies. Along with senior leadership, these firms employ skilled professionals in accounting, logistics, and information technology to assist in the management of company operations.

While management firms include a wide variety of business sectors, company management in the Southwest region is primarily involved in just a few industries. Area companies provide management for industries such as software and data processing, construction, and transportation. Though it has the lowest concentration of any of the clusters, it contributes a large amount of employment to the region and had an annual growth rate that exceeded the national average between 2003 and 2007.

Southwest Region

INDUSTRY CONTRIBUTION IMPACT: PAPER MANUFACTURING

Pattern recognition is important since changes to business production can have broad regional impacts across a range of linked industries and institutions. Paper manufacturing is analyzed in this example of how those connections positively influence the area's economy.

Paper manufacturing consists of paper and paperboard mills, electric power generation, natural gas distribution, printing ink and adhesive manufacturing. The industry makes paper cartons and cardboards that are typically inputs to other final products sold in export markets, thereby bringing additional money into the regional economy.

Paper manufacturing workers are paid above-average wages. An addition of 100 employees in paper manufacturing creates an estimated total of 188 jobs paying \$7.4 million in salaries and contributing over \$9.4 million to the gross state product. The value-added per worker in paper manufacturing and supporting industries is \$50,000.



Paper Manufacturing Impact: Addition of 100 employees

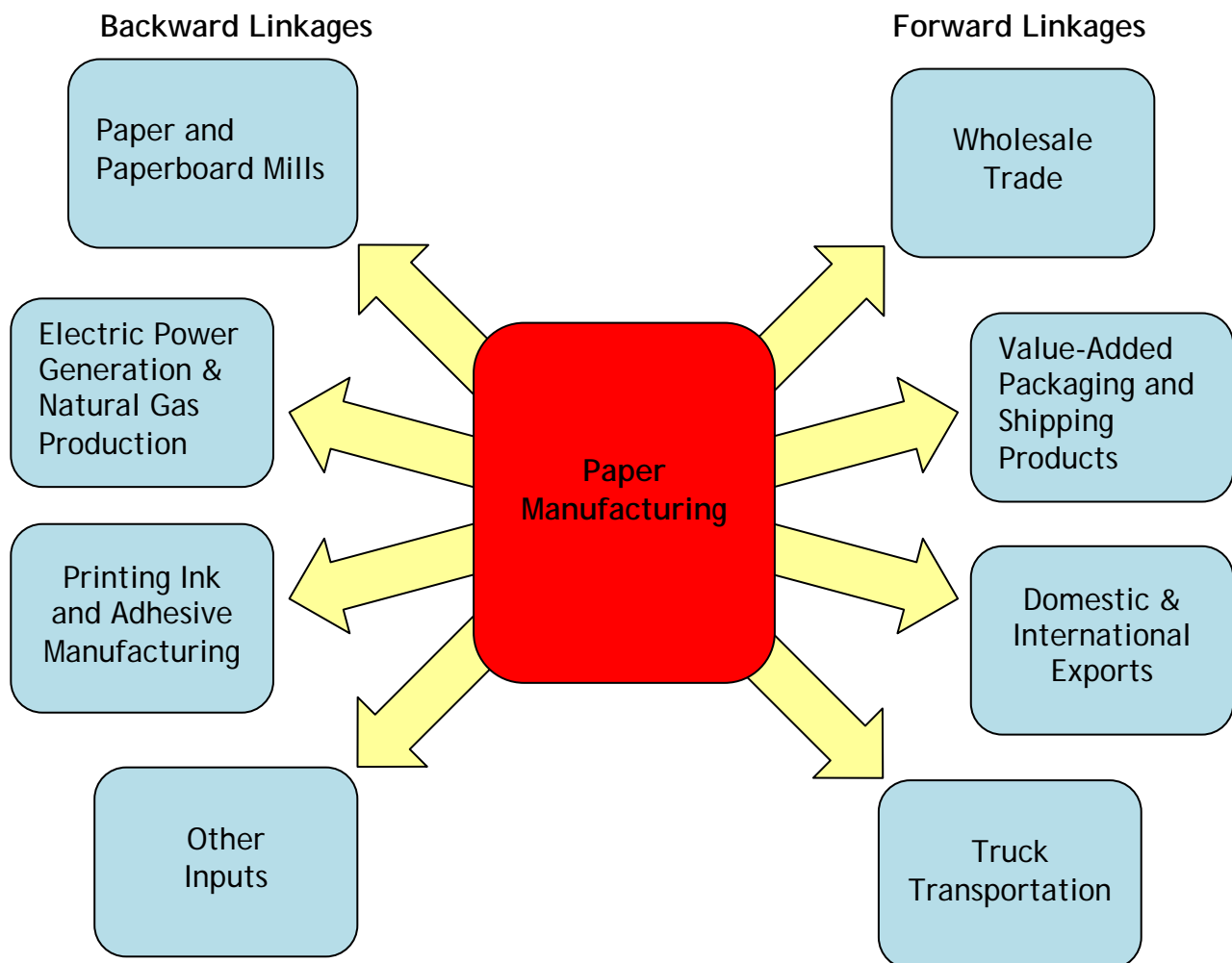
	Direct Impact	Indirect Impact	Total Impact
Employment	100	88	188
Labor Income*	\$4.2M	\$3.2M	\$7.4M
Gross Domestic Product	\$4.4M	\$5.0M	\$9.4M

*Labor income includes employee benefits and proprietors income.

Southwest Region

INDUSTRY INTERLINKAGES: PAPER MANUFACTURING

Paper manufacturing in the Southwest region employs a large number of workers and through linkages, supports many additional jobs. Backward-linked (supply goods and raw materials to the industry) and forward-linked (produce value-added goods for consumers) activities display the interrelationship between various industries that add value to paper manufacturing. While the backward linkages are between the suppliers of raw materials to the industry, forward linkages are between the industry and the consumers.



Southwest Region

NOTES

Industry Analysis of a Region's Economic Core

While a business is classified by the primary service or product it creates, another distinction is the market it serves. Companies that target customers outside a region are considered export-based, or core, whereas other businesses mainly serve local customers. Grocery stores, retailers, and doctor's offices are typical examples of local market firms. The distinction between export and local market businesses is important when considering long range economic viability and development.

Export-market industries, by serving customers outside a region, bring new dollars into an economy and form the economic core of the community. Think of manufacturers and large-scale farming. Both industries serve national and global markets and therefore attract new income into the region that is paid out in wages, interests, rents, and profits. By contrast, a local market industry largely churns existing dollars within a region. While local services are absolutely important to a thriving community, seldom can an area's population maintain a robust economy by only selling things to each other; it has to export goods and services to bring in new wealth.

Defining Export-Market Industries

Although some businesses are commonly thought of as exporters, location quotient (LQ) analysis provides a more comprehensive approach. This quotient indicates how concentrated an industry's employment is in a certain area as compared to the U.S. average. If an industry has an LQ of 2.0 then it is twice as concentrated in employment as the U.S. average.

Location Quotient

$\frac{\text{Regional Employment}_{\text{INDUSTRY}}}{\text{Regional Employment}_{\text{TOTAL}}}$	$\frac{\text{U.S. Employment}_{\text{INDUSTRY}}}{\text{U.S. Employment}_{\text{TOTAL}}}$
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Location quotients can help identify regional industries that may be exporting a substantial amount of goods and services to outside markets. If an industry is much more concentrated than the national average, firms are likely creating more products than the local economy can consume. Industries typically considered as primary exporters include:

Large Agriculture and Forestry Operations

Mining

Manufacturing

Management Headquarters

Tourism*

**High retail/accommodation/restaurant LQ associated with destination spots.*



Southwest Region

The list of primary exporters should be supplemented with LQ analysis to determine other industries that may be generating a large amount of income from outside a region. Services such as information technology, design and engineering, and research are often examples in metropolitan areas.

Identifying Industry Patterns

The industries with the highest LQ and combined employment were analyzed in the context of the region's economy and knowledge of individual firms to determine if an industry pattern existed. Employment from 2003-2007 was analyzed to coincide with Missouri's growth period during the last business cycle and to control for more recent recessionary effects. However, first quarter 2009 employment and business closures were reviewed to see if a pattern had greatly diminished due to major structural changes after the period of primary analysis.

Spot Strengths were identified as high LQ and employment sectors where 3 or fewer companies employed over 80 percent of the industry's workforce. Spot firm employment or wage information cannot be disclosed due to confidentiality restrictions in the QCEW program. However, this report does try to identify those firm's connections to larger clusters where applicable.

Spot firms employ a large percentage of workers and attract supply chain industries. These businesses are so prominent in a local economy, think of "factory towns," that the firms can overshadow other regional industries. If a Spot business moves out of an area then the industry concentration (LQ) leaves with it, thereby introducing a vulnerability to the region's economy.

Core Cluster patterns takes into account the number of businesses and employment within the region that make up an industry concentration. Cluster businesses are more diversified in firm count. Three or less firms do not account for over 80 percent of industry employment.

Core clusters benefit from the transfer of knowledge and a shared, skilled workforce that close proximity brings. Supply chains develop to serve these companies and competition keeps prices down. Experienced industry entrepreneurs periodically dream up better products, spin-off new local firms, and grow the economic core of a community.

While all companies are influenced by larger economic trends, having a number of similar businesses in an area helps diversify the risk and rewards as each company focuses on specialized products. These core cluster businesses collectively benefit from supporting services and workforce training that is tailored to common industry needs.

Southwest Region

SOURCES

1. Quarterly Census of Employment and Wages, 2003-2008 Annual Averages, Bureau of Labor Statistics. The location quotient, cluster summaries and chart are based on 2007 employment and 2003-2007 trends to capture information during the last growth cycle and control for recessionary effects. Location quotient analyzed using the BLS Regional Data Analysis Tool (RDAT).
2. Local Employment Dynamics Program, 2008, U.S. Census Bureau.
3. Census of Agriculture, 2007, U.S. Department of Agriculture.
4. IMPLAN Economic Impact Model, 2007, MIG Inc.

Spring 2010

Primary Research: Tom Reichart
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Missouri Economic Research and Information Center
Department of Economic Development, Division of Business and Community Services



PATTERN ANALYSIS

HIGHLIGHTING INDUSTRY PATTERNS THAT DRIVE NEW
WEALTH IN A REGIONAL ECONOMY

GREATER SPRINGFIELD
REGION



MORE WITH
MERIC
TIMELY TARGETED INTELLIGENT

Department of Economic Development

Greater Springfield Region

AN INTRODUCTION TO INDUSTRY PATTERN ANALYSIS

Discovering patterns of connected industries can be difficult given the number of companies in an economy and the data available for analysis. Yet understanding the business patterns that drive wealth in a region is critical to designing effective development initiatives.

This report uses industry trend, concentration, and individual firm data to summarize two important patterns in a region's economic core:

- **Spot Strengths** of large sector employment, typically in one or two firms, and
- **Core Clusters** of employment across a mix of similar or linked industries.

Recognizing spot strengths and core cluster patterns is important as these collectively large employers attract new income to a region. Knowing these industries, and the shared supply-chain and labor issues these companies have, can aid economic and workforce developers in the crafting of policies for the broadest impact.

Pattern analysis highlights the strengths and linkages of area industries and can serve as a starting point for understanding a regional economy. People familiar with company operations know that no two firms have the same business model. Pattern information should ultimately be enhanced by individuals with local business knowledge.

See the **NOTES** section for more details on industry pattern analysis and the methods used in this report.





Greater Springfield Region

What comes after “Pattern Recognition?”

Economic and workforce developers have been speaking the “cluster” language for a long time. However, just knowing that a spot strength or core cluster pattern exists is only one step in the process. Here are some additional things to consider:

Group Think

While large, individual businesses will always be important and drive some policy actions, decision-makers can use pattern knowledge to focus efforts on the common problems that related businesses have. This approach makes the best use of limited resources by providing the biggest impact to the most companies.

Customize Help

One size does not fit all when it comes to supporting an industry pattern. Assisting a business cluster may involve specific projects like expanding utilities or broader actions such as helping attract additional knowledge workers. Whatever the needs, the pattern approach can help prioritize actions.

Work on Workforce

Many business location or expansion decisions revolve around issues of available labor. Workforce training geared toward supporting clusters can be very valuable as many of the firms hire workers with similar skill sets. Likewise, talented workers want to locate where clusters of similar businesses offer better odds at finding employment.

Career centers, community colleges, and universities can customize training programs to meet the need of cluster industries for specialized workers.

Spread the Word

Economic and workforce developers can tell the story of how a region’s industries and institutions create clusters of opportunity for existing companies, workers, and new investment. Examples such as the Animal Health Corridor (Missouri-Kansas) and the Plant and Medical Sciences Cluster (St. Louis) are excellent branding campaigns that highlight the combined strengths of businesses, universities, incubators, and workforce to form clusters of growth.

Plan for the Future

The current recession reminds everyone that major structural changes in the economy will occur from time to time. Missouri’s automotive industry is undergoing that change right now. Developers that understand a region’s pattern of industries will be better positioned to promote new opportunities of growth that fit well with an economy’s existing and transforming strengths.

Greater Springfield Region

INDUSTRY OVERVIEW

The Greater Springfield region has a population of 521,120 which accounts for 8.71% of Missouri's total population. There are 224,545 people employed in the region, mostly around the Springfield metro area.* Vacation destinations in Branson and Springfield make tourism the top industry in this region. This strong economic driver brings revenue into the region and helps to create additional employment in its supporting industries. A concentration of employment in Food Manufacturing, Machinery Manufacturing, and Trucking and Logistics is also a vital component to the region's economic well-being.

Springfield Region Industry Employment 2008				
NAICS	Industry	Annual Avg. Emp.	Perc. Total Emp.	Annual Avg. Wage
11	Agriculture, Forestry, Fishing, and Hunting	358	0.2%	\$24,624
21	Mining	257	0.1%	\$40,627
22	Utilities	1,262	0.6%	\$64,127
23	Construction	12,632	5.6%	\$36,711
31-33	Manufacturing	18,044	8.0%	\$37,257
42	Wholesale Trade	10,214	4.5%	\$43,709
44-45	Retail Trade	31,166	13.9%	\$22,686
48-49	Transportation and Warehousing	11,374	5.1%	\$37,228
51	Information	4,998	2.2%	\$37,883
52	Finance and Insurance	9,637	4.3%	\$41,435
53	Real Estate and Rental and Leasing	4,197	1.9%	\$26,942
54	Professional, Scientific, and Technical Services	6,668	3.0%	\$41,545
55	Management of Companies and Enterprises	3,485	1.6%	\$47,461
56	Administrative and Support Services	11,279	5.0%	\$23,902
61	Educational Services	17,683	7.9%	\$32,919
62	Health Care and Social Assistance	34,195	15.2%	\$39,843
71	Arts, Entertainment, and Recreation	6,364	2.8%	\$19,392
72	Accommodation and Food Services	25,996	11.6%	\$14,638
81	Other Services	7,499	3.3%	\$22,145
92	Public Administration	7,238	3.2%	\$38,681
TOTAL		224,545		\$31,714

* Local Employment Dynamics, U.S. Census Bureau, 2008.

Greater Springfield Region

INDUSTRY PATTERNS

In terms of employment, Tourism and the supporting industries of Retail Trade, Accommodations, and Food Services have a very strong presence in the Greater Springfield region. Branson, known as the "Live Music Show Capital of the World," is the main driver of the tourism industry in the region.

Industry Pattern Type and Location Quotient (LQ)

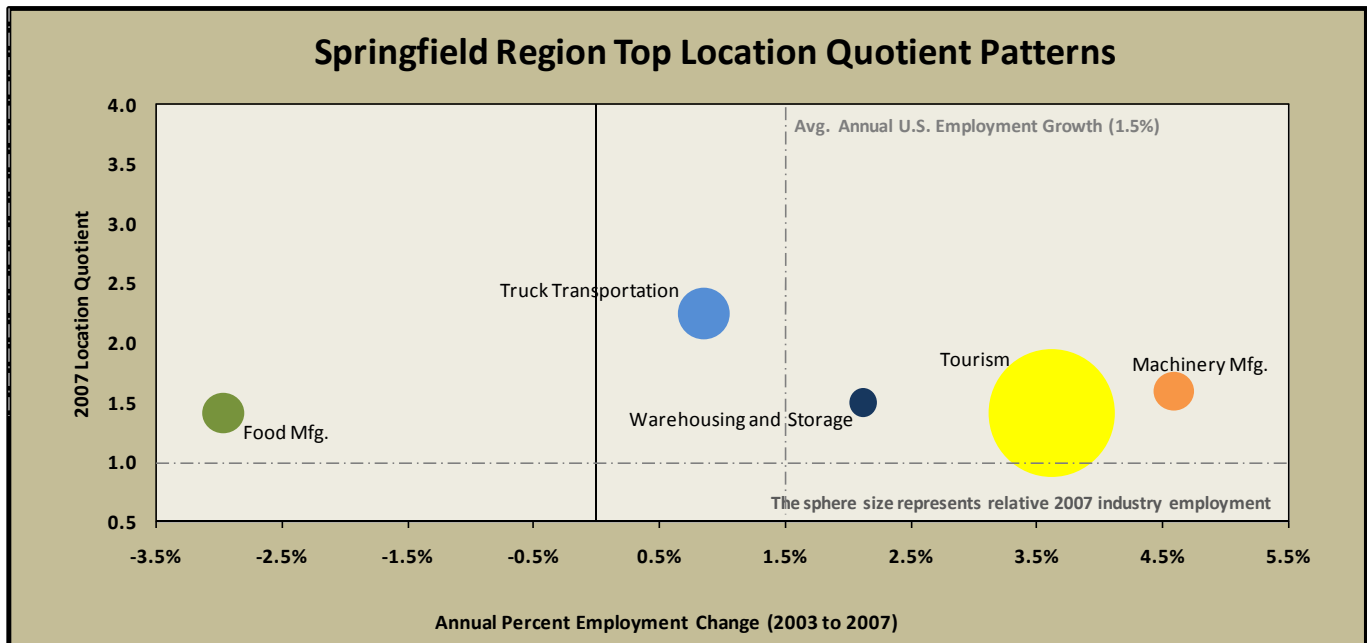
TYPE	NAICS	INDUSTRY	LQ
Cluster	311	Food Manufacturing	1.4
Cluster	333	Machinery Manufacturing	1.6
Cluster	484	Truck Transportation	2.5
Spot	493	Warehousing and Storage	1.8
Cluster		Tourism	1.4

Along with Tourism, the Springfield region has a number of industries that help support the economy. Food and Machinery Manufacturing, along with Trucking and Logistics, account for over seven percent of private employment in the region. Tourism and related industries account for over 17 percent of the region's employment.

Cluster Summary

Pattern	Food Mfg.	Machinery Mfg.	Trucking and Logistics		Tourism
Industry	Food Mfg.	Machinery Mfg.	Truck Transportation	Warehousing, Storage, and Related Logistics (Spot Strength)	Tourism-Related Industries
Location Quotient	1.4	1.6	2.5	1.8	1.4
Employment	3,595	3,273	5,591	ND	33,877
Avg. Wage	\$37,330	\$41,523	\$37,748	ND	\$16,143
Description	Transformation of livestock or agricultural goods into products for intermediate or final consumption.	Creating end products that apply mechanical force through forging, stamping, and bending processes.	Provides over-the-road transportation of cargo using motor vehicles, such as trucks and trailers.	Engaged in operating warehousing and storage facilities for general merchandise and other products. Firms take responsibility for storing and securing goods and may also provide a range of logistics services related to the distribution of goods.	Food Services, Accommodations, Specialty Retail and Travel, and Entertainment Services related to a Destination Tourist Location

Greater Springfield Region



Food Manufacturing Cluster

Food Manufacturing (NAICS 311)

Subgroup of Firms in:

Company Management (NAICS 551)

Food manufacturing, while not a spot cluster, does owe a large part of its employment to just a few national food manufacturers and over 65 percent of its employment comes from dairy product manufacturing. This cluster was the only one in the region that did not show employment growth between 2003 and 2007. Employment in this industry continues to decline, dropping more than 30 percent between 2007 and 2009.

Machinery Manufacturing Cluster

Machinery Manufacturing (NAICS 333)

The Machinery Manufacturing cluster consists of companies that make industrial machinery that serves as inputs to anything from farm machinery to food product machinery. This cluster had a strong LQ of 1.6 in 2007 and showed the highest annual employment growth for the region between 2003 and 2007. However, recent figures do show an employment decline, particularly in industrial machinery manufacturing.

Trucking and Logistics Cluster

Truck Transportation (NAICS 484)

Warehousing and Storage (NAICS 493) SPOT STRENGTH

Trucking and Logistics includes two distinct industries that serve similar customers and perform complementary functions. The Truck Transportation industry had the highest concentration of all the region's industry patterns at 2.5. This industry is divided into general



Greater Springfield Region

freight trucking and specialized freight trucking. General freight trucking establishments handle a wide variety of commodities, while specialized freight transportation companies handle cargo that requires specialized equipment for transport. It is further sub-divided into local and long-distance trucking. While it had below-average growth between 2003 and 2007, Truck Transportation accounted for the majority of employment in the Trucking and Logistics cluster with 5,591 employees. Of this, over 90 percent is long-distance trucking.

Warehousing and Storage is the other component of the Trucking and Logistics cluster. Companies in this industry primarily operate warehousing and storage facilities for general merchandise, refrigerated goods, and other warehouse products. Though they do not sell the goods they handle, they provide a crucial function for the many industries they serve. This industry exceeded the U.S. growth rate between 2003 and 2007 with annual increases greater than 2 percent.

Tourism Cluster

53 Detailed NAICS Industries - See Notes Section for Details

Perhaps the most important industry cluster in terms of employment and economic impact for the Springfield region, the Tourism cluster as a whole employed 33,877 in 2007.[†] Between 2003 and 2007 employment averaged an increase of 3.6 percent, 2nd out of the industry clusters just behind Machinery Manufacturing. This industry cluster had a LQ of 1.41 in 2007, up slightly from 1.4 in 2003.

Taking a closer look at the Tourism cluster within the region reveals that Taney County, which includes both Branson and Silver Dollar City, has a concentration over 3 times that of the national average, and more than double that of the Springfield region. And while Greene County accounts for nearly half of the employment in the Tourism industries—due in large part to the presence of Missouri State University—Taney County is responsible for one third of the tourism employment in the region. Together these two counties combine to account for over 80 percent of the region's tourism employment.

According to a 2008 Division of Tourism study, Branson was the 2nd most visited destination by Missouri travelers, with visits by 33 percent of all Missouri travelers.[‡] This was just behind St. Louis, which was a destination for 34 percent of Missouri travelers. Springfield and Silver Dollar City were top destinations as well, with visits from 14 and 12 percent of Missouri travelers, respectively. Altogether, the Springfield region had 3 of the top 5 destinations for Missouri travelers.

[†] Estimates based on 53 NAICS-defined industries from DED and the Economic Impact of Missouri's Tourism and Travel Industry - FY08. 2009. Michael Kaylen, University of Missouri.

[‡] Where Do Travelers Go in Missouri--CY08, Visitor Profiles, Division of Tourism, Missouri Dept. of Economic Development.

Greater Springfield Region

INDUSTRY CONTRIBUTION IMPACT: MACHINERY MANUFACTURING

Pattern recognition is important since changes to business production can have broad regional impacts across a range of linked industries and institutions. Machinery manufacturing is analyzed in this example of how those connections positively influence the area's economy.

Machinery manufacturing includes the primary inputs of iron, steel mills, ferroalloy manufacturing, air and gas compressor, gas and electric power generation, semiconductor, relay and control manufacturing, generator and ball bearing manufacturing. The industry makes machinery that is modified for value-added manufacturing and the products sold in export markets, thereby bringing additional money into the regional economy.

Machinery manufacturing workers are among the highest paid in the region at over \$41,000. An addition of 100 employees in machinery manufacturing creates an estimated total of 211 jobs paying \$10.2 million in salaries and contributing over \$15.2 million to the gross state product. The value-added per worker in machinery manufacturing and supporting industries is \$71,902.



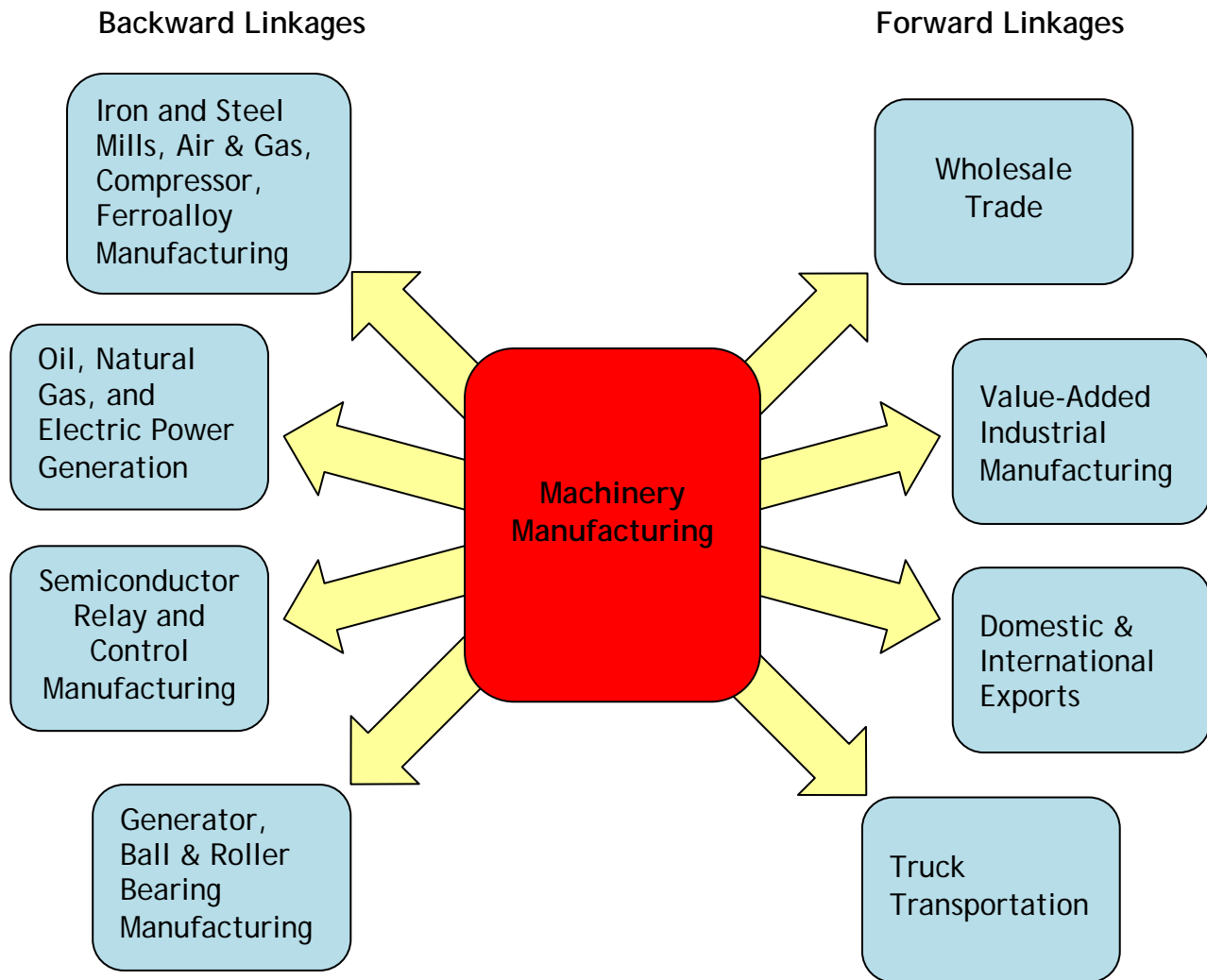
Machinery Manufacturing Impact: Addition of 100 employees			
	Direct Impact	Indirect Impact	Total Impact
Employment	100	111.4	211.4
Labor Income*	\$6.2M	\$4.0M	\$10.2M
Gross Domestic Product	\$8.6M	\$6.6M	\$15.2M

*Labor income includes employee benefits and proprietors income.

Greater Springfield Region

INDUSTRY INTERLINKAGES: MACHINERY MANUFACTURING

Machinery manufacturing in the Springfield region employs over 3,200 workers. Backward-linked (supply goods and raw materials to the industry) and forward-linked (produce value-added goods for consumers) activities display the interrelationship between various industries that add value to machinery manufacturing. While the backward linkages are between the suppliers of raw materials to the industry, forward linkages are between the industry and the consumers.



Greater Springfield Region

NOTES

Industry Analysis of a Region's Economic Core

While a business is classified by the primary service or product it creates, another distinction is the market it serves. Companies that target customers outside a region are considered export-based, or core, whereas other businesses mainly serve local customers. Grocery stores, retailers, and doctor's offices are typical examples of local market firms. The distinction between export and local market businesses is important when considering long range economic viability and development.

Export-market industries, by serving customers outside a region, bring new dollars into an economy and form the economic core of the community. Think of manufacturers and large-scale farming. Both industries serve national and global markets and therefore attract new income into the region that is paid out in wages, interests, rents, and profits. By contrast, a local market industry largely churns existing dollars within a region. While local services are absolutely important to a thriving community, seldom can an area's population maintain a robust economy by only selling things to each other; it has to export goods and services to bring in new wealth.

Defining Export-Market Industries

Although some businesses are commonly thought of as exporters, location quotient (LQ) analysis provides a more comprehensive approach. This quotient indicates how concentrated an industry's employment is in a certain area as compared to the U.S. average. If an industry has an LQ of 2.0 then it is twice as concentrated in employment as the U.S. average.

Location Quotient

$\frac{\text{Regional Employment}_{\text{INDUSTRY}}}{\text{Regional Employment}_{\text{TOTAL}}}$	$\frac{\text{U.S. Employment}_{\text{INDUSTRY}}}{\text{U.S. Employment}_{\text{TOTAL}}}$
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Location quotients can help identify regional industries that may be exporting a substantial amount of goods and services to outside markets. If an industry is much more concentrated than the national average, firms are likely creating more products than the local economy can consume. Industries typically considered as primary exporters include:

Large Agriculture and Forestry Operations

Mining

Manufacturing

Management Headquarters

Tourism*

**High retail/accommodations/restaurant LQ associated with destination spots.*



Greater Springfield Region

The list of primary exporters should be supplemented with LQ analysis to determine other industries that may be generating a large amount of income from outside a region. Services such as information technology, design and engineering, and research are often examples in metropolitan areas.

Identifying Industry Patterns

The industries with the highest LQ and combined employment were analyzed in the context of the region's economy and knowledge of individual firms to determine if an industry pattern existed. Employment from 2003-2007 was analyzed to coincide with Missouri's growth period during the last business cycle and to control for more recent recessionary effects. However, first quarter 2009 employment and business closures were reviewed to see if a pattern had greatly diminished due to major structural changes after the period of primary analysis.

Spot Strengths were identified as high LQ and employment sectors where 3 or fewer companies employed over 80 percent of the industry's workforce. Spot firm employment or wage information cannot be disclosed due to confidentiality restrictions in the QCEW program. However, this report does try to identify those firm's connections to larger clusters where applicable.

Spot firms employ a large percentage of workers and attract supply chain industries. These businesses are so prominent in a local economy, think of "factory towns," that the firms can overshadow other regional industries. If a Spot business moves out of an area then the industry concentration (LQ) leaves with it, thereby introducing a vulnerability to the region's economy.

Core Cluster patterns takes into account the number of businesses and employment within the region that make up an industry concentration. Cluster businesses are more diversified in firm count. Three or less firms do not account for over 80 percent of industry employment.

Core clusters benefit from the transfer of knowledge and a shared, skilled workforce that close proximity brings. Supply chains develop to serve these companies and competition keeps prices down. Experienced industry entrepreneurs periodically dream up better products, spin-off new local firms, and grow the economic core of a community.

While all companies are influenced by larger economic trends, having a number of similar businesses in an area helps diversify the risk and rewards as each company focuses on specialized products. These core cluster businesses collectively benefit from supporting services and workforce training that is tailored to common industry needs.

Greater Springfield Region

Tourism- Related Industries

53 industries were defined as tourism-related for this report. Industries are indicated below at the 6 digit NAICS level, the most detailed industry classification. NAICS derived from combination of Department of Economic Development and University of Missouri sources.

NAICS DESCRIPTION	NAICS DESCRIPTION
114210 Hunting and trapping	712130 Zoos and botanical gardens
312120 Breweries	712190 Nature parks and similar institutions
312130 Wineries	713110 Amusement and theme parks
453220 Gift, novelty, and souvenir stores	713120 Amusement arcades
487110 Scenic and sightseeing transp., land	713210 Casinos, except casino hotels
487210 Scenic and sightseeing transp., water	713290 Other gambling industries
487990 Scenic and sightseeing transp., other	713910 Golf courses and country clubs
532292 Recreational goods rental	713920 Skiing facilities
561510 Travel agencies	713930 Marinas
561520 Tour operators	713940 Fitness and recreational sports centers
561591 Convention and visitors bureaus	713990 All other amusement and rec. industries
561599 All other travel arrangement services	721110 Hotels and motels, except casino hotels
611620 Sports and recreation instruction	721120 Casino hotels
611699 Miscellaneous schools and instruction	721191 Bed-and-breakfast inns
711110 Theater companies and dinner theaters	721199 All other traveler accommodation
711120 Dance companies	721211 RV parks and campgrounds
711130 Musical groups and artists	721214 Recreational and vacation camps
711190 Other performing arts companies	721310 Rooming and boarding houses
711211 Sports teams and clubs	722110 Full-service restaurants
711212 Racetracks	722211 Limited-service restaurants
711219 Other spectator sports	722212 Cafeterias
711310 Promoters with facilities	722213 Snack and nonalcoholic beverage bars
711320 Promoters without facilities	722310 Food service contractors
711410 Agents and managers for public figures	722320 Caterers
711510 Independent artists and writers	722330 Mobile food services
712110 Museums	722410 Drinking places, alcoholic beverages
712120 Historical sites	



Greater Springfield Region

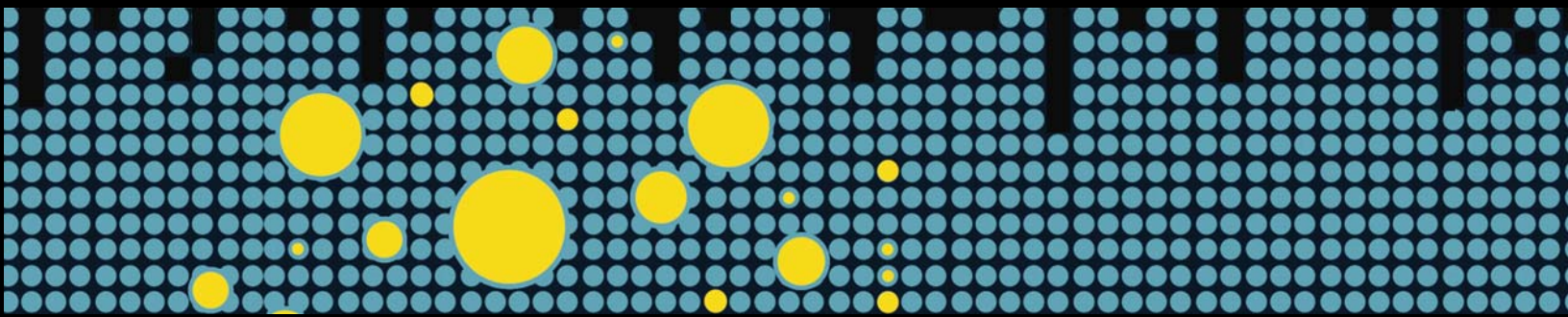
SOURCES

1. Quarterly Census of Employment and Wages, 2003-2008 Annual Averages, Bureau of Labor Statistics. The location quotient, cluster summaries and chart are based on 2007 employment and 2003-2007 trends to capture information during the last growth cycle and control for recessionary effects. Location quotient analyzed using the BLS Regional Data Analysis Tool (RDAT).
2. Local Employment Dynamics Program, 2008, U.S. Census Bureau.
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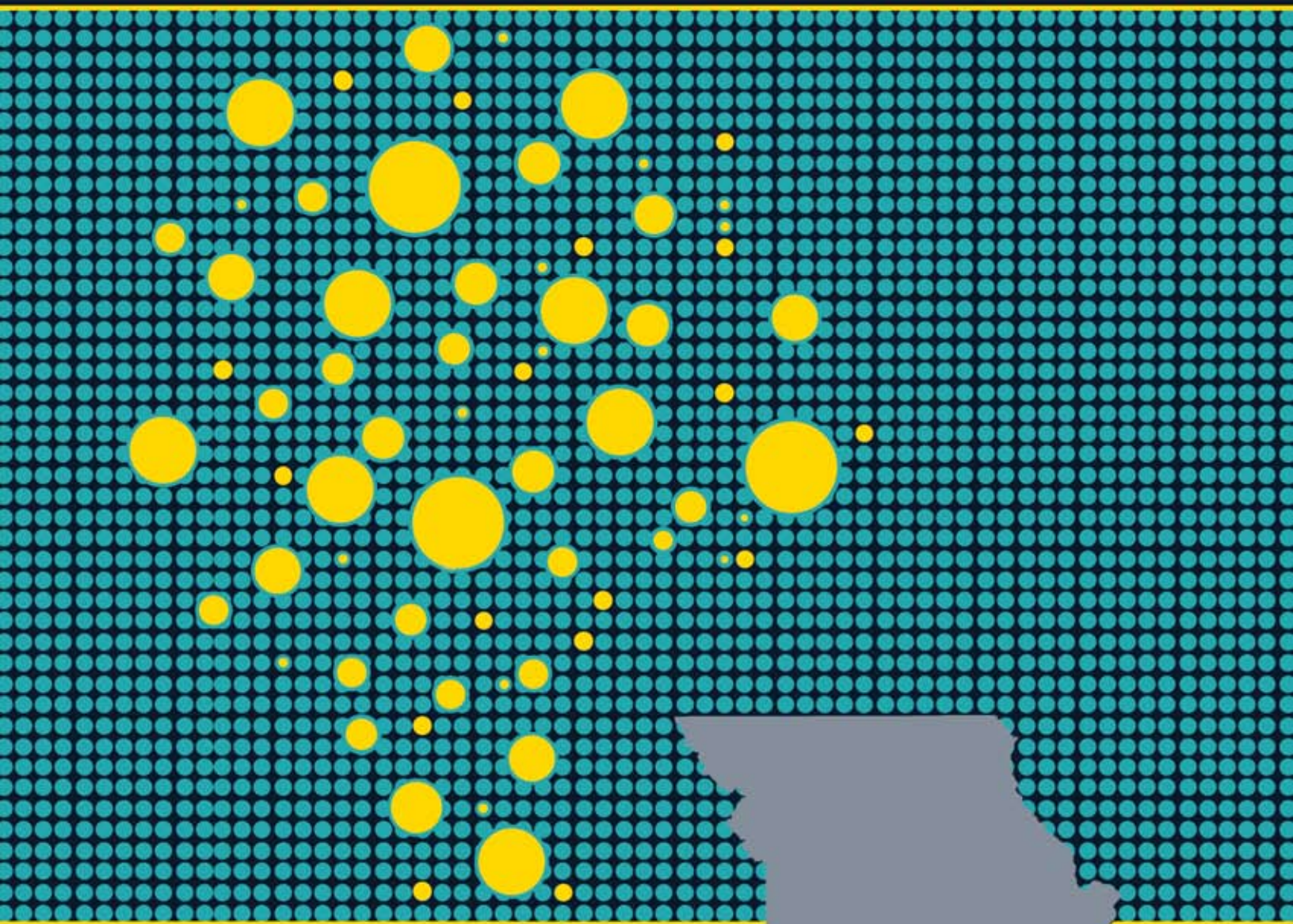
Primary Research: Tom Reichart
Graphic Design: Maggie Lear

Missouri Economic Research and Information Center
Department of Economic Development, Division of Business and Community Services



PATTERN ANALYSIS

HIGHLIGHTING INDUSTRY PATTERNS THAT DRIVE NEW
WEALTH IN A REGIONAL ECONOMY



LOWER SOUTH CENTRAL
REGION



Lower South Central Region

AN INTRODUCTION TO INDUSTRY PATTERN ANALYSIS

Discovering patterns of connected industries can be difficult given the number of companies in an economy and the data available for analysis. Yet understanding the business patterns that drive wealth in a region is critical to designing effective development initiatives.

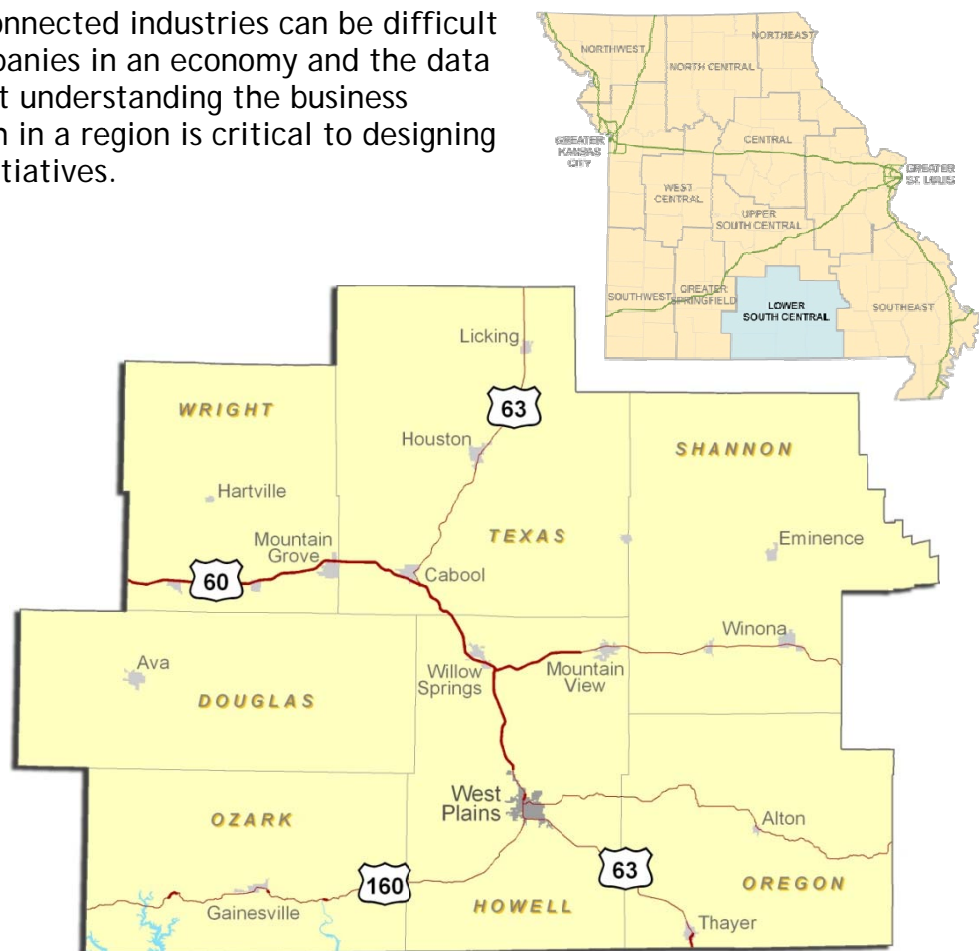
This report uses industry trend, concentration, and individual firm data to summarize two important patterns in a region's economic core:

- **Spot Strengths** of large sector employment, typically in one or two firms, and
- **Core Clusters** of employment across a mix of similar or linked industries.

Recognizing spot strengths and core cluster patterns is important as these collectively large employers attract new income to a region. Knowing these industries, and the shared supply-chain and labor issues these companies have, can aid economic and workforce developers in crafting policies for the broadest impact.

Pattern analysis highlights the strengths and linkages of area industries and can serve as a starting point for understanding a regional economy. People familiar with company operations know that no two firms have the same business model. Pattern information should ultimately be enhanced by individuals with local business knowledge.

See the **NOTES** section for more details on industry pattern analysis and the methods used in this report.





Lower South Central Region

What comes after “Pattern Recognition?”

Economic and workforce developers have been speaking the “cluster” language for a long time. However, just knowing that an industry pattern exists is only one step in the process. Here are some additional things to consider:

Group Think

While large, individual businesses will always be important and drive some policy actions, decision-makers can use pattern knowledge to focus efforts on the common problems that related businesses have. This approach makes the best use of limited resources by providing the biggest impact to the most companies.

Customize Help

One size does not fit all when it comes to supporting an industry pattern. Assisting a business cluster may involve specific projects like expanding utilities or broader actions such as helping attract additional knowledge workers. Whatever the needs, the pattern approach can help prioritize actions.

Work on Workforce

Many business location or expansion decisions revolve around issues of available labor. Workforce training geared toward supporting clusters can be very valuable as many of the firms hire workers with similar skill sets. Likewise, talented workers want to locate where clusters of similar businesses offer better odds at finding employment.

Career centers, community colleges, and universities can customize training programs to meet the need of cluster industries for specialized workers.

Spread the Word

Economic and workforce developers can tell the story of how a region’s industries and institutions create clusters of opportunity for existing companies, workers, and new investment. Examples such as the Animal Health Corridor (Missouri-Kansas) and the Plant and Medical Sciences Cluster (St. Louis) are excellent branding campaigns that highlight the combined strengths of businesses, universities, incubators, and workforce to form clusters of growth.

Plan for the Future

The current recession reminds everyone that major structural changes in the economy will occur from time to time. Missouri’s automotive industry is undergoing that change right now. Developers that understand a region’s pattern of industries will be better positioned to promote new opportunities of growth that fit well with an economy’s existing and transforming strengths.

Lower South Central Region

INDUSTRY OVERVIEW

The Lower South Central region has a population of 123,393, which accounts for 2 percent of Missouri's total population. Howell County, where West Plains is located, is the economic center of the region employing one in three area workers (34 percent). Just over 6 percent of region residents commute to Springfield for jobs.* The average wage in 2008 was \$25,328, considerably lower than the state average of \$40,710.

In 2008 non-farm employment for the area was 33,529, which includes public and private sectors. Manufacturing employed over 18 percent of area workers, a higher percentage than all but one of Missouri's 12 economic regions. Manufacturing, combined with retail and healthcare sectors, employ nearly half of all workers. Although most employment in the primary farming sector is not captured by this measure, over 8,200 people were estimated to be either a farm owner or worker in 2007.** Many of these farmers may also have other jobs, but clearly agriculture in a significant part of this region's economy.

Lower South Central Region Industry Employment 2008				
NAICS	Industry	Annual Avg. Emp.	Perc. Total Emp.	Annual Avg. Wage
11	Agriculture, Forestry, Fishing, and Hunting	202	0.6%	\$20,608
21	Mining	95	0.3%	\$29,714
22	Utilities	353	1.1%	\$47,995
23	Construction	1,062	3.2%	\$25,413
31-33	Manufacturing	6,139	18.3%	\$29,174
42	Wholesale Trade	1,034	3.1%	\$28,933
44-45	Retail Trade	5,055	15.1%	\$19,285
48-49	Transportation and Warehousing	1,310	3.9%	\$30,923
51	Information	439	1.3%	\$26,107
52	Finance and Insurance	1,062	3.2%	\$31,671
53	Real Estate and Rental and Leasing	265	0.8%	\$19,319
54	Professional, Scientific, and Technical Services	829	2.5%	\$30,947
55	Management of Companies and Enterprises	224	0.7%	\$45,915
56	Administrative and Support Services	618	1.8%	\$20,606
61	Educational Services	3,820	11.4%	\$28,195
62	Health Care and Social Assistance	4,902	14.6%	\$27,016
71	Arts, Entertainment, and Recreation	301	0.9%	\$14,957
72	Accommodation and Food Services	2,652	7.9%	\$10,303
81	Other Services	924	2.8%	\$14,756
92	Public Administration	2,246	6.7%	\$29,777
TOTAL		33,529		\$25,328

* Local Employment Dynamics, U.S. Census Bureau, 2008.

**The most accurate and timely industry employment numbers come from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages program (QCEW). However, reporting requirements for this program excludes most farmers so the USDA 2007 Census of Agriculture is used as an alternative, non-comparative measure.

Lower South Central Region

INDUSTRY PATTERNS

Industry pattern analysis revealed how important manufacturing is to the Lower South Central Region along with which subsectors were the most concentrated.

Manufacturing, from 2003 to 2009, employed 1 in 4 workers in the private sector. Four strong patterns of industry concentration were found in Wood Product, Apparel, Electrical Equipment, and Transportation Equipment Manufacturing. These combined pattern strengths employed 16 percent of the private sector.*

Industry Pattern Type and Location Quotient (LQ)

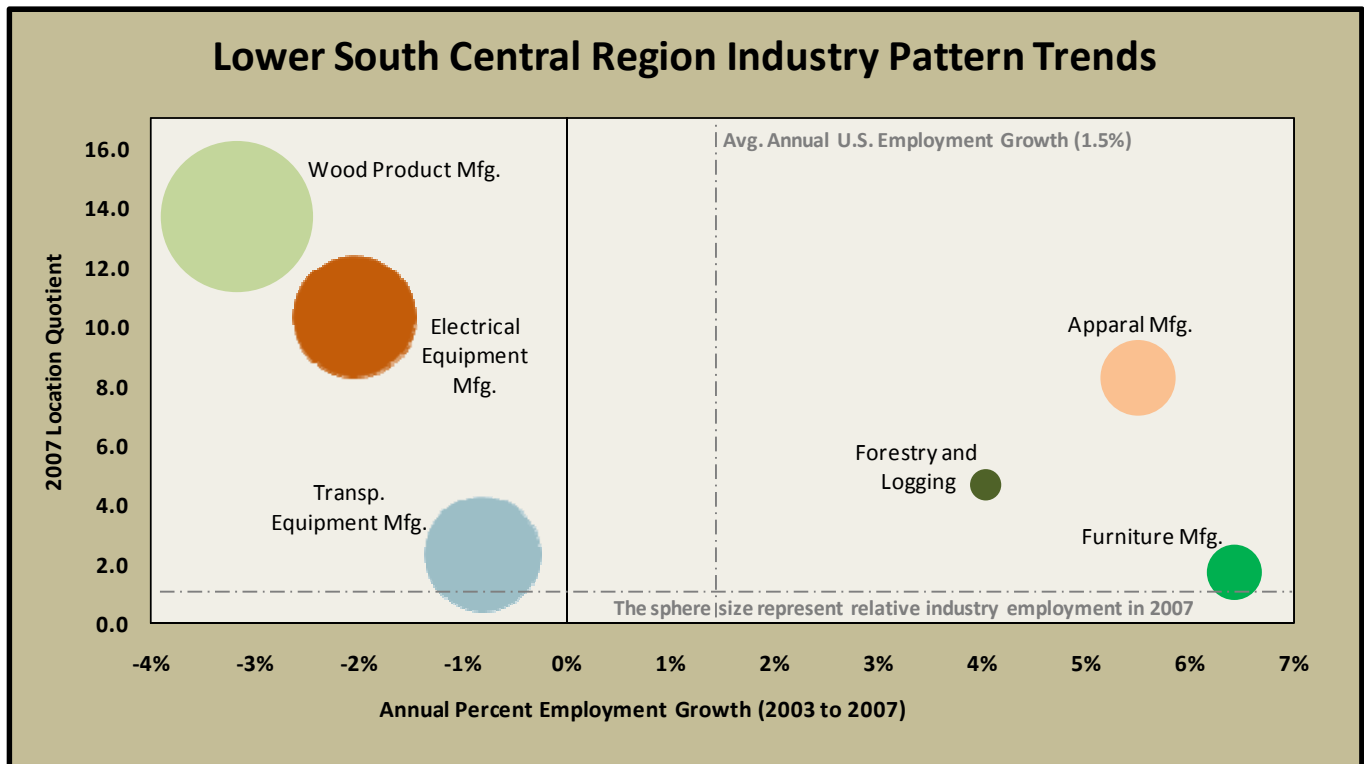
TYPE	NAICS	INDUSTRY	LQ
Cluster	113	Forestry and Logging	4.7
Cluster	321	Wood Product Mfg.	13.7
Cluster	337	Furniture and Related Mfg.	1.7
Spot	315	Apparel Mfg.	8.3
Spot	335	Electrical Equip. Mfg.	10.4
Spot	336	Transportation Equip. Mfg.	2.4

Pattern Summary

Pattern	Wood Products Cluster	Apparel Mfg.	Electrical Equip. Mfg.	Transportation Equip. Mfg.
Industry	Wood Product and Furniture Manufacturing, Forestry and Logging	Apparel Manufacturing (Spot Strength)	Electrical Equipment and Appliance Manufacturing (Spot Strength)	Transportation Equipment Manufacturing (Spot Strength)
Location Quotient	7.5	8.3	10.4	2.4
Employment	1,946	ND*	ND*	ND*
Avg. Wage	\$24,414	ND*	ND*	ND*
Description	Cluster grows, harvest, and processes timber into a variety of wood products. Processes include sawmilling, wood treatment, design and production of wood and other materials into finished goods.	Producers of clothing include apparel contractors performing cutting/sewing operations, jobbers performing entrepreneurial apparel functions, and tailors producing custom indiv. garments.	Manufacture products that generate, distribute and use electrical power to include lighting, appliances, power distribution components, transformers, etc.	Produce and assemble metal, plastic, and other material components into finished transportation equipment. Includes the mfg. of road, rail, air, or water vehicles primarily used for transporting people or goods.

* Precise spot industry employment and wages are non-disclosable (ND) due to state and federal confidentiality requirements.

Lower South Central Region



Wood Products Cluster

Forestry and Logging (NAICS 113)

Wood Product Manufacturing (NAICS 321)

Furniture and Related Products Manufacturing (NAICS 337)

The Lower South Central region has a long history of producing wood products, thanks to an abundant supply of soft and hardwood trees located in Missouri's Ozark Mountains. The state is a leading U.S. producer of wood pallets, which primarily come from this region. Pallet production fits well with the state's strength as a logistical hub of the Midwest.

The Wood Products Cluster encompasses the growing, harvesting, and processing of timber into final goods for public or business consumption. This cluster has a very high LQ of 7.5 and is the largest employing pattern industry. Employment did decline in the region during the analysis period, mirroring national industry trends.

Companies in the cluster specialize in sawmill operations, pallet production, cabinet making, and flooring. The recession did impact these firms as the overall manufacturing and construction sectors were hit particularly hard. However, as of late 2009 this cluster was still the largest pattern employer. Hopefully the industry will see growth when the economy turns



Lower South Central Region

around since the proximity to timber and basic logistic need for pallets will remain unchanged.

Apparel Manufacturing Spot Strength

Apparel Manufacturing (NAICS 315)

Although one of the smaller pattern industries in the region, apparel manufacturing has an LQ over 8.0 and has bucked national industry trends with employment growth in the mid-2000s. While apparel manufacturing declined in the U.S. at an annual rate of 7.7 percent, firms in this region grew at an annual average of 5.5 percent from 2003-2007.

As a local spot strength amid the backdrop of a larger, changing U.S. apparel industry, these companies may have developed market niches that will hopefully enable continued growth into the future.

Electrical Equipment Manufacturing Spot Strength

Electrical Equipment and Appliance Manufacturing (NAICS 335)

Electrical equipment manufacturing is a spot strength in this area with a very high LQ of 10.4 in 2007. Although the industry lost employment from 2003-2007, it did grow through the recession. By 2009 the industry's regional LQ had grown to over 14 as national employment in electrical equipment manufacturing declined during the recession.

Firms in this region specialize in electric motors and utility components, just as the two regions north of it. This pattern strength is located in a number of areas throughout Missouri and combines into a statewide core cluster.

Transportation Equipment Manufacturing Spot Strength

Transportation Equipment Manufacturing (NAICS 336)

Transportation equipment manufacturing has an LQ of 2.4 in the Lower South Central region. Although employment has declined since 2003, following national trends, this industry is still a large subsector of area manufacturing.

Local companies specialize in vehicle suspensions, power trains, and defense-related transportation products. Truck and van production has been an historical Missouri strength that recently underwent setbacks with the closing of assembly plants in St. Louis. These firms have specialties that may not be related to those production facilities.

Lower South Central Region

INDUSTRY CONTRIBUTION IMPACT: FURNITURE MANUFACTURING

Pattern recognition is important since changes to business production can have broad regional impacts across a range of linked industries and institutions. Furniture manufacturing is analyzed in this example of how those connections positively influence the area's economy.

Furniture manufacturing consists of sawmills, wood preservation, reconstituted wood product manufacturing, veneer and plywood manufacturing, paint and coating manufacturing, and hardware manufacturing. The industry makes wooden furniture products sold in export markets, thereby bringing additional money into the regional economy.

An addition of 100 employees in furniture manufacturing creates an estimated total of 174 jobs paying \$7.1 million in salaries and contributing over \$9.8 million to the gross state product. The value-added per worker in furniture manufacturing and supporting industries is \$56,322.



Furniture Manufacturing Impact: Addition of 100 employees

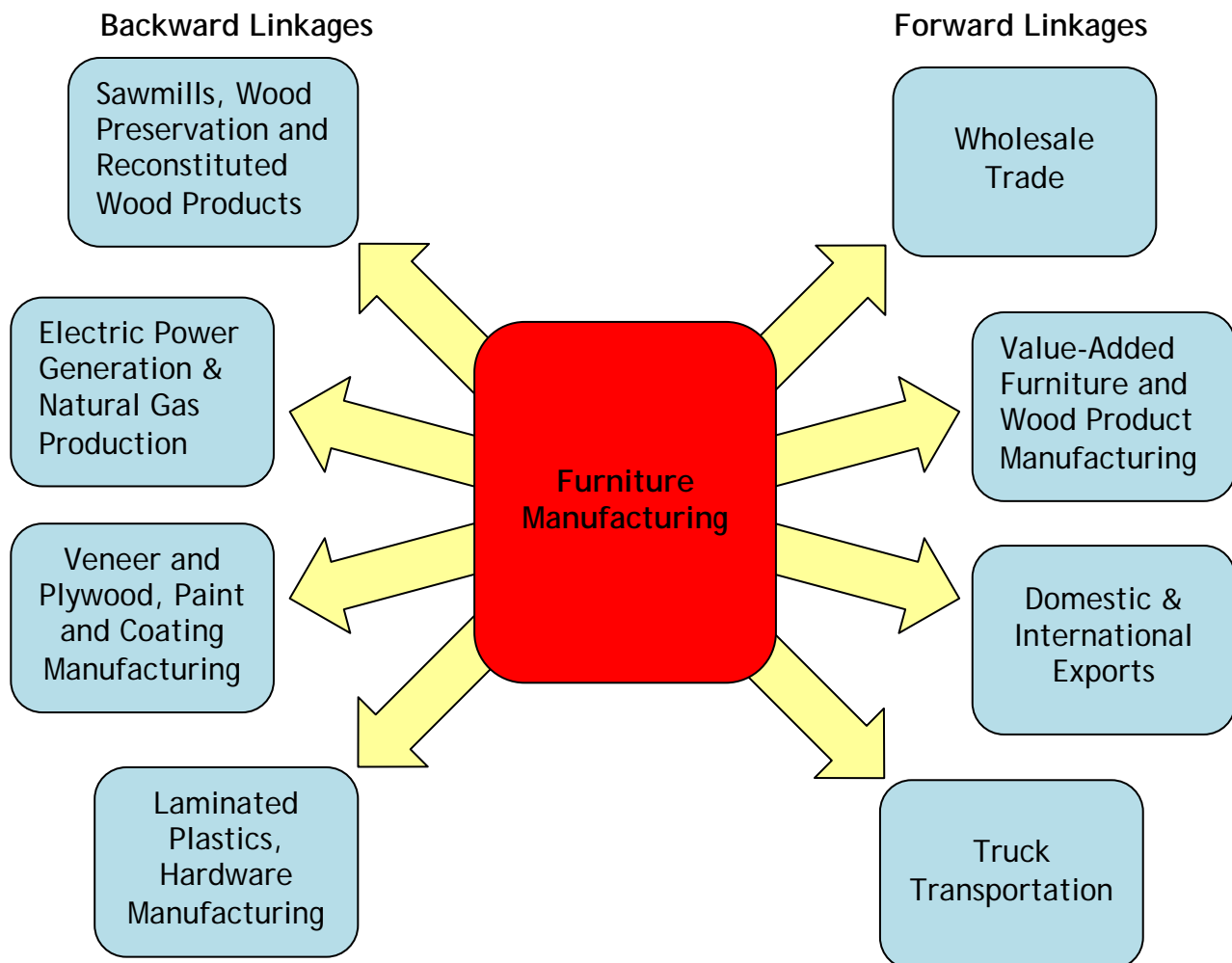
	Direct Impact	Indirect Impact	Total Impact
Employment	100	74	174
Labor Income*	\$5.0M	\$2.1M	\$7.1M
Gross Domestic Product	\$6.2M	\$3.6M	\$9.8M

*Labor income includes employee benefits and proprietors income.

Lower South Central Region

INDUSTRY INTERLINKAGES: FURNITURE MANUFACTURING

Furniture manufacturing in the Lower South Central region is part of the Wood Products Cluster. Backward-linked (supply goods and raw materials to the industry) and forward-linked (produce value-added goods for consumers) activities display the interrelationship between various industries that add value to furniture manufacturing. While the backward linkages are between the suppliers of raw materials to the industry, forward linkages are between the industry and the consumers.



Lower South Central Region

NOTES

Industry Analysis of a Region's Economic Core

While a business is classified by the primary service or product it creates, another distinction is the market it serves. Companies that target customers outside a region are considered export-based, or core, whereas other businesses mainly serve local customers. Grocery stores, retailers, and doctor's offices are typical examples of local market firms. The distinction between export and local market businesses is important when considering long range economic viability and development.

Export-market industries, by serving customers outside a region, bring new dollars into an economy and form the economic core of the community. Think of manufacturers and large-scale farming. Both industries serve national and global markets and therefore attract new income into the region that is paid out in wages, interests, rents, and profits. By contrast, a local market industry largely churns existing dollars within a region. While local services are absolutely important to a thriving community, seldom can an area's population maintain a robust economy by only selling things to each other; it has to export goods and services to bring in new wealth.

Defining Export-Market Industries

Although some businesses are commonly thought of as exporters, location quotient (LQ) analysis provides a more comprehensive approach. This quotient indicates how concentrated an industry's employment is in a certain area as compared to the U.S. average. If an industry has an LQ of 2.0 then it is twice as concentrated in employment as the U.S. average.

Location Quotient

$\frac{\text{Regional Employment}_{\text{INDUSTRY}}}{\text{Regional Employment}_{\text{TOTAL}}}$	$\frac{\text{U.S. Employment}_{\text{INDUSTRY}}}{\text{U.S. Employment}_{\text{TOTAL}}}$
--	--

Location quotients can help identify regional industries that may be exporting a substantial amount of goods and services to outside markets. If an industry is much more concentrated than the national average, firms are likely creating more products than the local economy can consume. Industries typically considered as primary exporters include:

Large Agriculture and Forestry Operations

Mining

Manufacturing

Management Headquarters

Tourism*

**High retail/accommodation/restaurant LQ associated with destination spots.*



Lower South Central Region

The list of primary exporters should be supplemented with LQ analysis to determine other industries that may be generating a large amount of income from outside a region. Services such as information technology, design and engineering, and research are often examples in metropolitan areas.

Identifying Industry Patterns

The industries with the highest LQ and combined employment were analyzed in the context of the region's economy and knowledge of individual firms to determine if an industry pattern existed. Employment from 2003-2007 was analyzed to coincide with Missouri's growth period during the last business cycle and to control for more recent recessionary effects. However, third quarter 2009 employment and business closures were reviewed to see if a pattern had greatly diminished due to major structural changes after the period of primary analysis.

Spot Strengths were identified as high LQ and employment sectors where 3 or fewer companies employed over 80 percent of the industry's workforce. Spot firm employment or wage information cannot be disclosed due to confidentiality restrictions in the QCEW program. However, this report does try to identify those firm's connections to larger clusters where applicable.

Spot firms employ a large percentage of workers and attract supply chain industries. These businesses are so prominent in a local economy, think of "factory towns," that the firms can overshadow other regional industries. If a Spot business moves out of an area then the industry concentration (LQ) leaves with it, thereby introducing a vulnerability to the region's economy.

Core Cluster patterns takes into account the number of businesses and employment within the region that make up an industry concentration. Cluster businesses are more diversified in firm count. Three or less firms do not account for over 80 percent of industry employment.

Core clusters benefit from the transfer of knowledge and a shared, skilled workforce that close proximity brings. Supply chains develop to serve these companies and competition keeps prices down. Experienced industry entrepreneurs periodically dream up better products, spin-off new local firms, and grow the economic core of a community.

While all companies are influenced by larger economic trends, having a number of similar businesses in an area helps diversify the risk and rewards as each company focuses on specialized products. These core cluster businesses collectively benefit from supporting services and workforce training that is tailored to common industry needs.

Lower South Central Region

SOURCES

1. Quarterly Census of Employment and Wages, 2003-2008 Annual Averages, Bureau of Labor Statistics. The location quotient, cluster summaries and chart are based on 2007 employment and 2003-2007 trends to capture information during the last growth cycle and control for recessionary effects. Location quotient analyzed using the BLS Regional Data Analysis Tool (RDAT).
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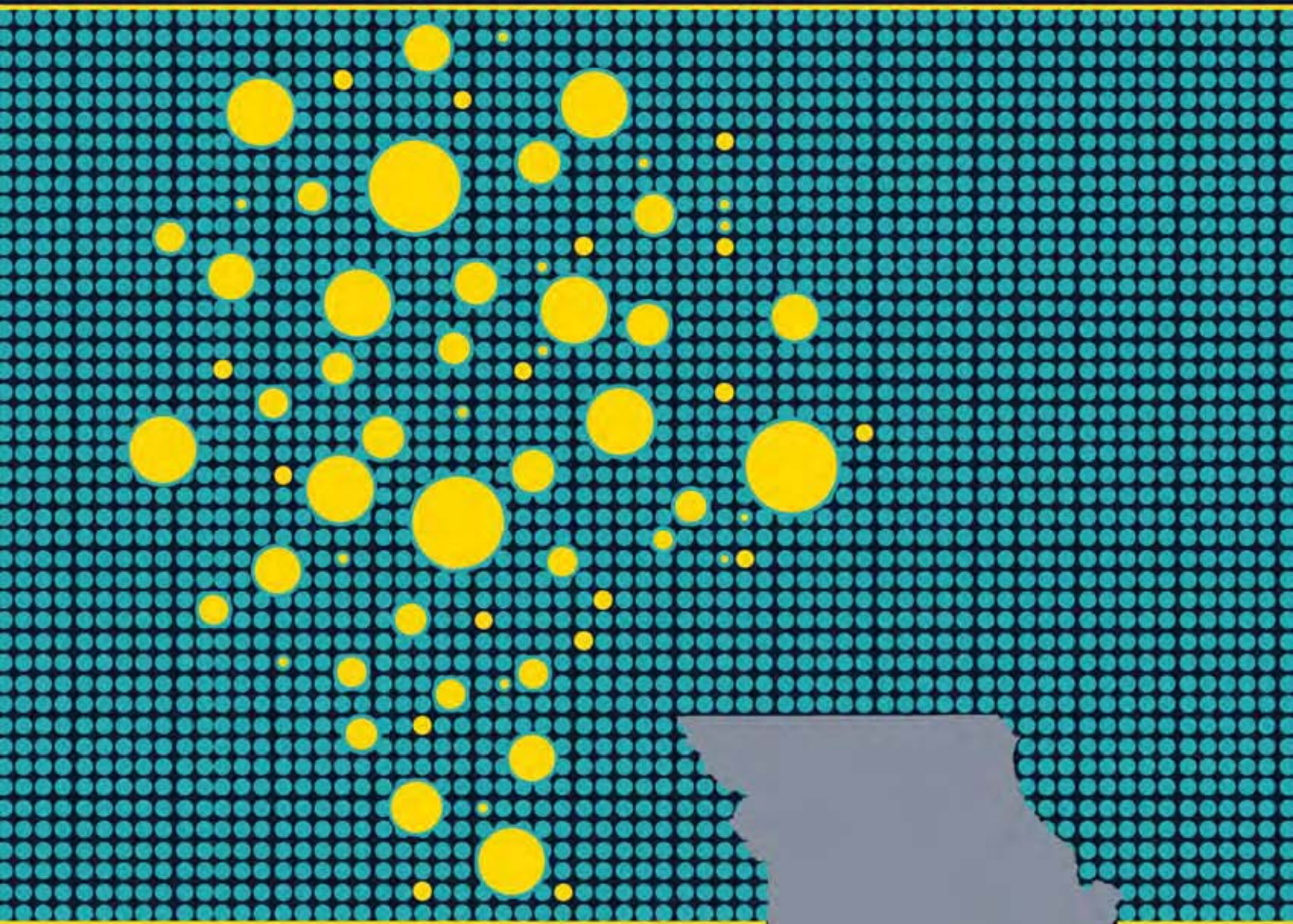
Primary Research: Alan Spell
Graphic Design: Maggie Lear

Missouri Economic Research and Information Center
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PATTERN ANALYSIS

HIGHLIGHTING INDUSTRY PATTERNS THAT DRIVE NEW
WEALTH IN A REGIONAL ECONOMY



SOUTHEAST REGION



AN INTRODUCTION TO INDUSTRY PATTERN ANALYSIS

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Southeast Region

What comes after “Pattern Recognition?”

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Group Think

While large, individual businesses will always be important and drive some policy actions, decision-makers can use pattern knowledge to focus efforts on the common problems that related businesses have. This approach makes the best use of limited resources by providing the biggest impact to the most companies.

Customize Help

One size does not fit all when it comes to supporting an industry pattern. Assisting a business cluster may involve specific projects like expanding utilities or broader actions such as helping attract additional knowledge workers. Whatever the needs, the pattern approach can help prioritize actions.

Work on Workforce

Many business location or expansion decisions revolve around issues of available labor. Workforce training geared toward supporting clusters can be very valuable as many of the firms hire workers with similar skill sets. Likewise, talented workers want to locate where clusters of similar businesses offer better odds at finding employment.

Career centers, community colleges, and universities can customize training programs to meet the need of cluster industries for specialized workers.

Spread the Word

Economic and workforce developers can tell the story of how a region’s industries and institutions create clusters of opportunity for existing companies, workers, and new investment. Examples such as the Animal Health Corridor (Missouri-Kansas) and the Plant and Medical Sciences Cluster (St. Louis) are excellent branding campaigns that highlight the combined strengths of businesses, universities, incubators, and workforce to form clusters of growth.

Plan for the Future

The current recession reminds everyone that major structural changes in the economy will occur from time to time. Missouri’s automotive industry is undergoing that change right now. Developers that understand a region’s pattern of industries will be better positioned to promote new opportunities of growth that fit well with an economy’s existing and transforming strengths.

Southeast Region

INDUSTRY OVERVIEW

The Southeast region has a population of 444,037, which accounts for 7.4 percent of Missouri's total population. Economic centers are spread throughout the region in cities like Cape Girardeau, Sikeston, Poplar Bluff, and Farmington. Cape Girardeau County accounts for the largest share of jobs at just over 18 percent.* The average wage in 2008 was \$29,039, considerably lower than the state average of \$40,710.

In 2008 non-farm employment for the area was 167,843, which includes public and private sectors. Healthcare and manufacturing accounted for one out of every three jobs. Although most employment in the primary farming sector is not captured by standard employment measures, over 13,600 people were estimated to be either a farm owner or worker in 2007.** Many of these farmers also have other jobs, but clearly agriculture is a significant part of this region's economy.

NAICS	Industry	Annual Avg. Emp.	Perc. Total Emp.	Annual Avg. Wage
11	Agriculture, Forestry, Fishing, and Hunting	2,408	1.4%	\$24,413
21	Mining	1,817	1.1%	\$55,306
22	Utilities	1,475	0.9%	\$55,280
23	Construction	8,236	4.9%	\$39,520
31-33	Manufacturing	25,548	15.2%	\$35,574
42	Wholesale Trade	6,165	3.7%	\$38,064
44-45	Retail Trade	21,891	13.0%	\$20,517
48-49	Transportation and Warehousing	7,024	4.2%	\$37,249
51	Information	2,298	1.4%	\$35,388
52	Finance and Insurance	4,857	2.9%	\$36,017
53	Real Estate and Rental and Leasing	1,476	0.9%	\$26,620
54	Professional, Scientific, and Technical Services	2,807	1.7%	\$33,600
55	Management of Companies and Enterprises	829	0.5%	\$44,593
56	Administrative and Support Services	6,167	3.7%	\$19,407
61	Educational Services	13,811	8.2%	\$31,501
62	Health Care and Social Assistance	31,508	18.8%	\$30,216
71	Arts, Entertainment, and Recreation	1,769	1.1%	\$16,443
72	Accommodation and Food Services	13,028	7.8%	\$11,312
81	Other Services	6,011	3.6%	\$15,104
92	Public Administration	8,721	5.2%	\$28,971
TOTAL		167,843		\$29,039

* Local Employment Dynamics, U.S. Census Bureau, 2006.

**The most accurate and timely industry employment numbers come from the Bureau of Labor Statistics, Quarterly Census of Employment and Wages program (QCEW). However, reporting requirements for this program excludes most farmers so the USDA 2007 Census of Agriculture is used as an alternative, non-comparative measure.

Southeast Region

INDUSTRY PATTERNS

Industry pattern analysis revealed several core clusters and a spot strength in Southeast Missouri. Agribusiness was found to be a wide-spread cluster while Mining and Plastics/Rubber Manufacturing represented clusters of diverse large to mid-sized firms. Machinery Manufacturing was a spot strength of large employment size.

Industry Pattern Type and Location Quotient (LQ)

TYPE	NAICS	INDUSTRY	LQ
Cluster	111	Crop production	2.5
Cluster	115	Agric. & Forestry Support	1.7
Spot	311	Food Manufacturing	2.0
Cluster	212	Mining (not Oil/Gas)	6.0
Cluster	326	Plastics/Rubber Product Mfg.	3.6
Spot	333	Machinery Manufacturing	1.9

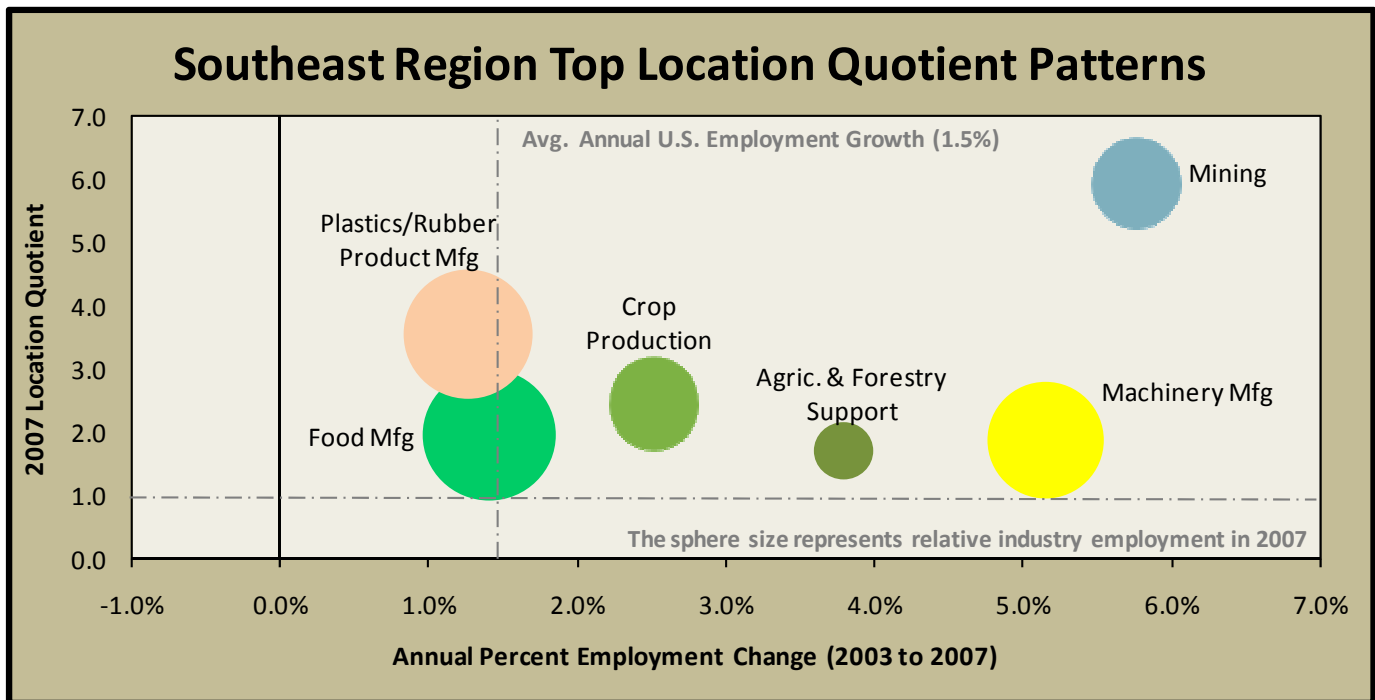
These core cluster and spot industries accounted for almost 10 percent of all private employment in the region.* Patterns reinforce the overall importance of agribusiness and manufacturing to this economy.

Cluster Summary

Cluster	Agribusiness			Mining	Plastics/Rubber Mfg
Industry	Crop Production	Agricultural and Forestry Support	Food Manufacturing (Spot Strength)	Mining, Except Oil and Gas	Plastics/Rubber Product Manufacturing
Location Quotient	2.46	1.71	1.96	5.95	3.56
Employment	1,604	684	ND	1,583	3,239
Avg. Wage	\$20,776	\$28,543	ND	\$57,453	\$34,799
Description	Engaged in growing crops mainly for food and fiber. Comprised primarily of farms, orchards, groves, and nurseries growing crops, plants, vines, trees and their seeds.	Support activities for agriculture or forestry producing firms such as commodity cultivating, harvesting, management, processing, etc.	Transforms livestock and agricultural products into goods for intermediate or final consumption. Food products are typically sold to wholesalers or retailers for distribution to consumers.	Primarily engaged in mining, mine site development, and preparing metallic minerals and nonmetallic minerals.	Engaged in the processing of plastic materials and/or raw rubber into value-added products. Processing typically includes molding and extrusion.

* Spot industry employment and wages by detailed sector is not reportable due to BLS confidentiality restrictions.

Southeast Region



Agribusiness Cluster

Crop Production (NAICS 111)

Agricultural and Forestry Support (NAICS 115)

Food Manufacturing (NAICS 311)

The Agribusiness cluster, comprised predominately of crop producers, agriculture support services, and food manufacturers, represents a significant and diverse industry in this region.* Farmers and food manufacturers both benefit from close proximity which reduces transportation costs. Nearby ports on the Mississippi River also provide bulk commodity transportation to export markets.

Crop producers, especially in the low lands near the Mississippi River, benefit from good climate and deep soil. Crops such as soybeans, corn, rice, and cotton are grown here and serve as major exports.

* Crop production employment used in the summary and location quotient is from the Quarterly Census of Employment and Wages (QCEW) and does not capture most farm production employment. The U.S. 2007 Census of Agriculture indicated that a combined total of 13,606 farm owners and hired labor worked in the Southeast Region but due to different collection methodologies cannot be directly added to the QCEW. However, the Agriculture Census employment numbers do highlight the greater significance of farm production to the region's economy.



Southeast Region

As the LQ Pattern chart illustrates, Agribusiness employment grew in the region from 2003 to 2007, particularly in production and support activities.

Mining Cluster

Mining, Except Oil and Gas (NAICS 212)

Mining is the most specialized cluster in the Southeast region with an LQ near 6. This means the industry is nearly six times as concentrated in mining employment as the U.S. average.

Industries in the region largely mine aggregate stones and metals for a variety of industries such as construction and manufacturing. Supporting transportation networks and industries are key elements to this sector's success.

Mining employment has grown at a faster rate than other clusters in the region. Employment grew at an annual rate of nearly 5.8 percent from 2003 to 2007. U.S. annual growth was 1.5 percent over the same time period.

Plastics/Rubber Products Manufacturing Cluster

Plastics and Rubber Products Manufacturing (NAICS 326)

Plastics and Rubber Products Manufacturing boast a regional LQ near 3.6, large employment, and a diverse number of firms that make it an important cluster for Southeast Missouri.

While some firms in this region are focused on automotive products, and hence greatly impacted by the downward trends in vehicle production, the majority serve broader markets. Packaging and flexible injection molding companies supply a wide range of sectors that can include food manufacturing, construction, medical supplies, and other consumer products.

This industry is important to watch even as recent job numbers have shown recessionary declines. Many of these companies are leaders in adaptive manufacturing that is the model for future capital investments. Companies that have flexible production lines can quickly change from molding one product to another. This rapid ability to respond to demand creates on-going opportunities for these firms to enter new markets.

Southeast Region

INDUSTRY CONTRIBUTION IMPACT: PLASTICS/RUBBER PRODUCT MANUFACTURING

Pattern recognition is important since changes to business production can have broad regional impacts across a range of linked industries and institutions. Plastics and rubber product manufacturing is analyzed in this example of how those connections positively influence the area's economy.

Plastics and Rubber Products Manufacturing uses inputs such as organic chemicals, rubber product manufacturing, electric power generation, natural gas production, and synthetic dye/pigment manufacturing to create value-added products. Regionally the industry makes packaging materials and parts that are typically inputs to other final products sold in export markets, thereby bringing additional money into the regional economy.

Workers in this cluster are among the highest paid in the region. An addition of 100 employees in this manufacturing sector creates an estimated total of 194 jobs paying \$9.0 million in salaries and contributing over \$15.9 million to the state's gross domestic product.



Plastics and Rubber Products Manufacturing Impact: Addition of 100 employees

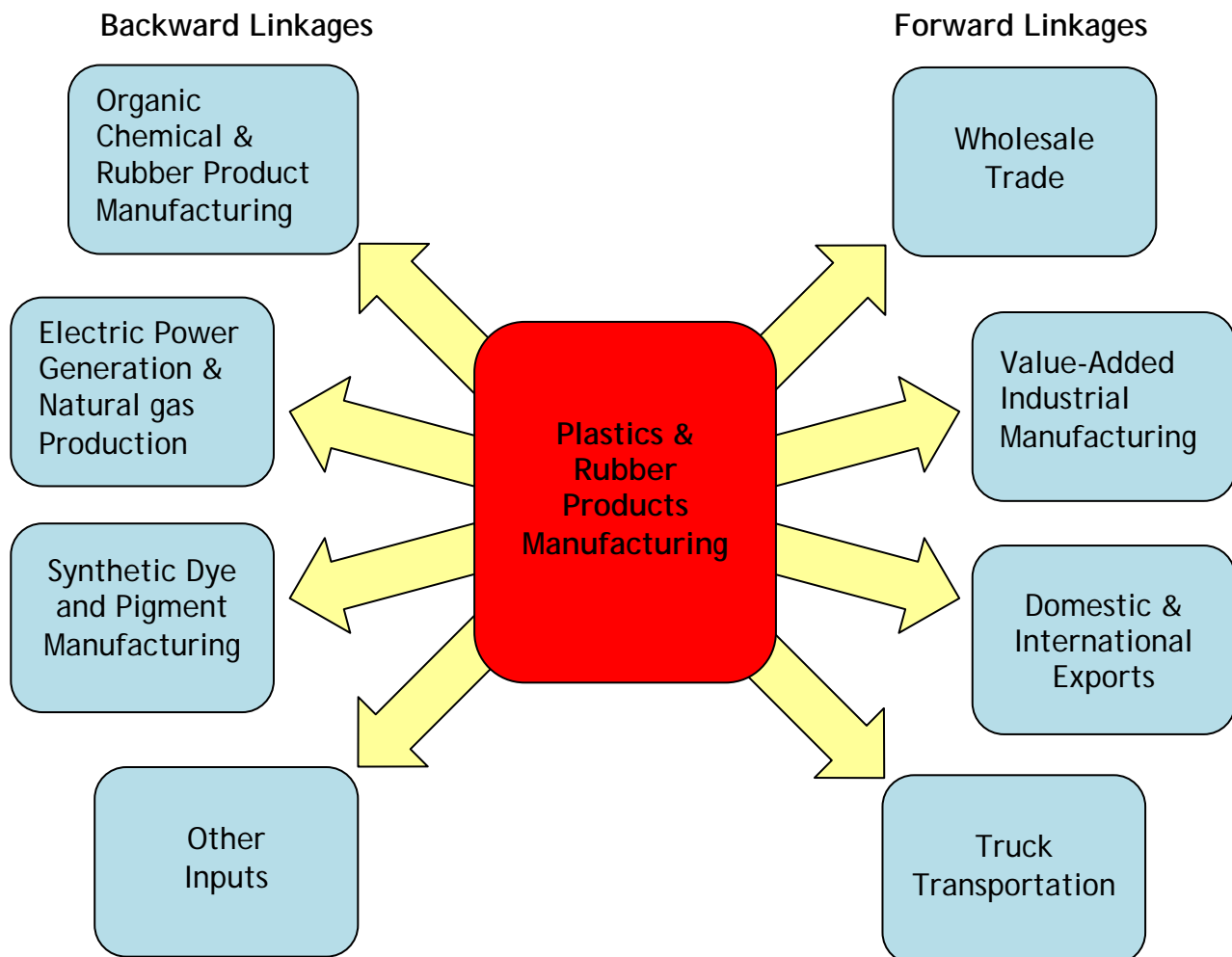
	Direct Impact	Indirect Impact	Total Impact
Employment	100	94	194
Labor Income*	\$5.7M	\$3.3M	\$9.0M
Gross Domestic Product	\$10.2M	\$5.7M	\$15.9M

*Labor income includes employee benefits and proprietors income.

Southeast Region

INDUSTRY INTERLINKAGES: PLASTICS/RUBBER PRODUCT MANUFACTURING

Plastics and Rubber Products Manufacturing employs around 3,000 workers in the region. Backward-linked (supply goods and raw materials to the industry) and forward-linked (produce value-added goods for consumers) activities display the interrelationship between various industries that add value to this sector. While the backward linkages are between the suppliers of raw materials to the industry, forward linkages are between the industry and the consumers.



Southeast Region

NOTES

Industry Analysis of a Region's Economic Core

While a business is classified by the primary service or product it creates, another distinction is the market it serves. Companies that target customers outside a region are considered export-based, or core, whereas other businesses mainly serve local customers. Grocery stores, retailers, and doctor's offices are typical examples of local market firms. The distinction between export and local market businesses is important when considering long range economic viability and development.

Export-market industries, by serving customers outside a region, bring new dollars into an economy and form the economic core of the community. Think of manufacturers and large-scale farming. Both industries serve national and global markets and therefore attract new income into the region that is paid out in wages, interests, rents, and profits. By contrast, a local market industry largely churns existing dollars within a region. While local services are absolutely important to a thriving community, seldom can an area's population maintain a robust economy by only selling things to each other; it has to export goods and services to bring in new wealth.

Defining Export-Market Industries

Although some businesses are commonly thought of as

exporters, location quotient (LQ) analysis provides a more comprehensive approach. This quotient indicates how concentrated an industry's employment is in a certain area as compared to the U.S. average. If an industry has an LQ of 2.0 then it is twice as concentrated in employment as the U.S. average.

Location Quotient

$\frac{\text{Regional Employment}_{\text{INDUSTRY}}}{\text{Regional Employment}_{\text{TOTAL}}}$	$\frac{\text{U.S. Employment}_{\text{INDUSTRY}}}{\text{U.S. Employment}_{\text{TOTAL}}}$
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Location quotients can help identify regional industries that may be exporting a substantial amount of goods and services to outside markets. If an industry is much more concentrated than the national average, firms are likely creating more products than the local economy can consume. Industries typically considered as primary exporters include:

Large Agriculture and Forestry Operations

Mining

Manufacturing

Management Headquarters

Tourism*

**High retail/restaurant LQ associated with destination spots.*



Southeast Region

The list of primary exporters should be supplemented with LQ analysis to determine other industries that may be generating a large amount of income from outside a region. Services such as information technology, design and engineering, and research are often examples in metropolitan areas.

Identifying Industry Patterns

The industries with the highest LQ and combined employment were analyzed in the context of the region's economy and knowledge of individual firms to determine if an industry pattern existed. Employment from 2003-2007 was analyzed to coincide with Missouri's growth period during the last business cycle and to control for more recent recessionary effects. However, first quarter 2009 employment and business closures were reviewed to see if a pattern had greatly diminished due to major structural changes after the period of primary analysis.

Spot Strengths were identified as high LQ and employment sectors where 3 or fewer companies employed over 80 percent of the industry's workforce. Spot firm employment or wage information cannot be disclosed due to confidentiality restrictions in the QCEW program. However, this report does try to identify those firm's connections to larger clusters where applicable.

Spot firms employ a large percentage of workers and attract supply chain industries. These businesses are so prominent in a local economy, think of "factory towns," that the firms can overshadow other regional industries. If a Spot business moves out of an area then the industry concentration (LQ) leaves with it, thereby introducing a vulnerability to the region's economy.

Core Cluster patterns takes into account the number of businesses and employment within the region that make up an industry concentration. Cluster businesses are more diversified in firm count. Three or less firms do not account for over 80 percent of industry employment.

Core clusters benefit from the transfer of knowledge and a shared, skilled workforce that close proximity brings. Supply chains develop to serve these companies and competition keeps prices down. Experienced industry entrepreneurs periodically dream up better products, spin-off new local firms, and grow the economic core of a community.

While all companies are influenced by larger economic trends, having a number of similar businesses in an area helps diversify the risk and rewards as each company focuses on specialized products. These core cluster businesses collectively benefit from supporting services and workforce training that is tailored to common industry needs.



Southeast Region

SOURCES

1. Quarterly Census of Employment and Wages, 2003-2008 Annual Averages, Bureau of Labor Statistics. The location quotient, cluster summaries and chart are based on 2007 employment and 2003-2007 trends to capture information during the last growth cycle and control for recessionary effects. Location quotient analyzed using the BLS Regional Data Analysis Tool (RDAT).
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